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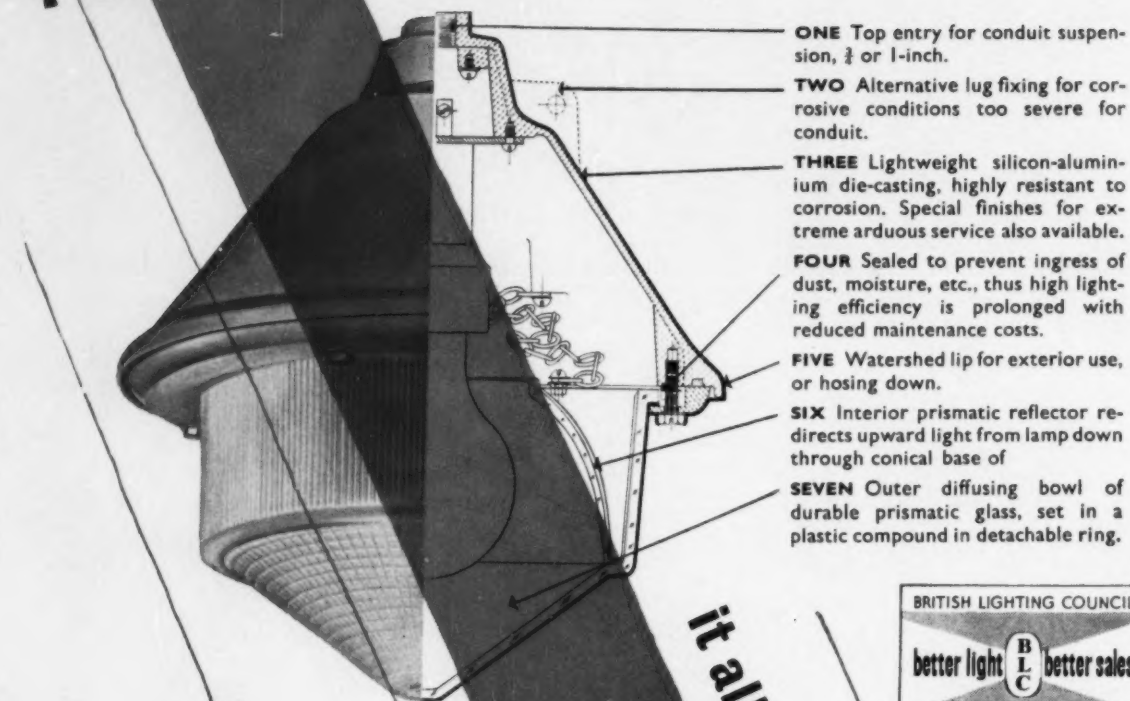
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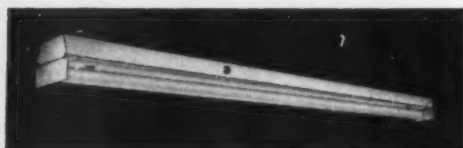
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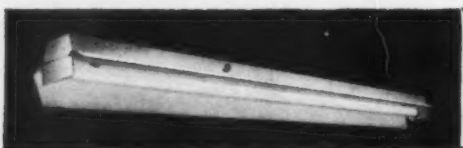
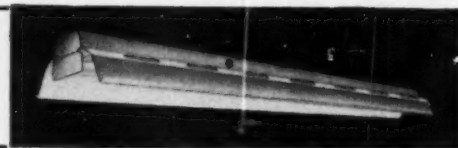
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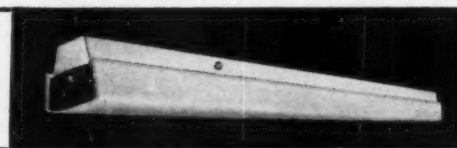
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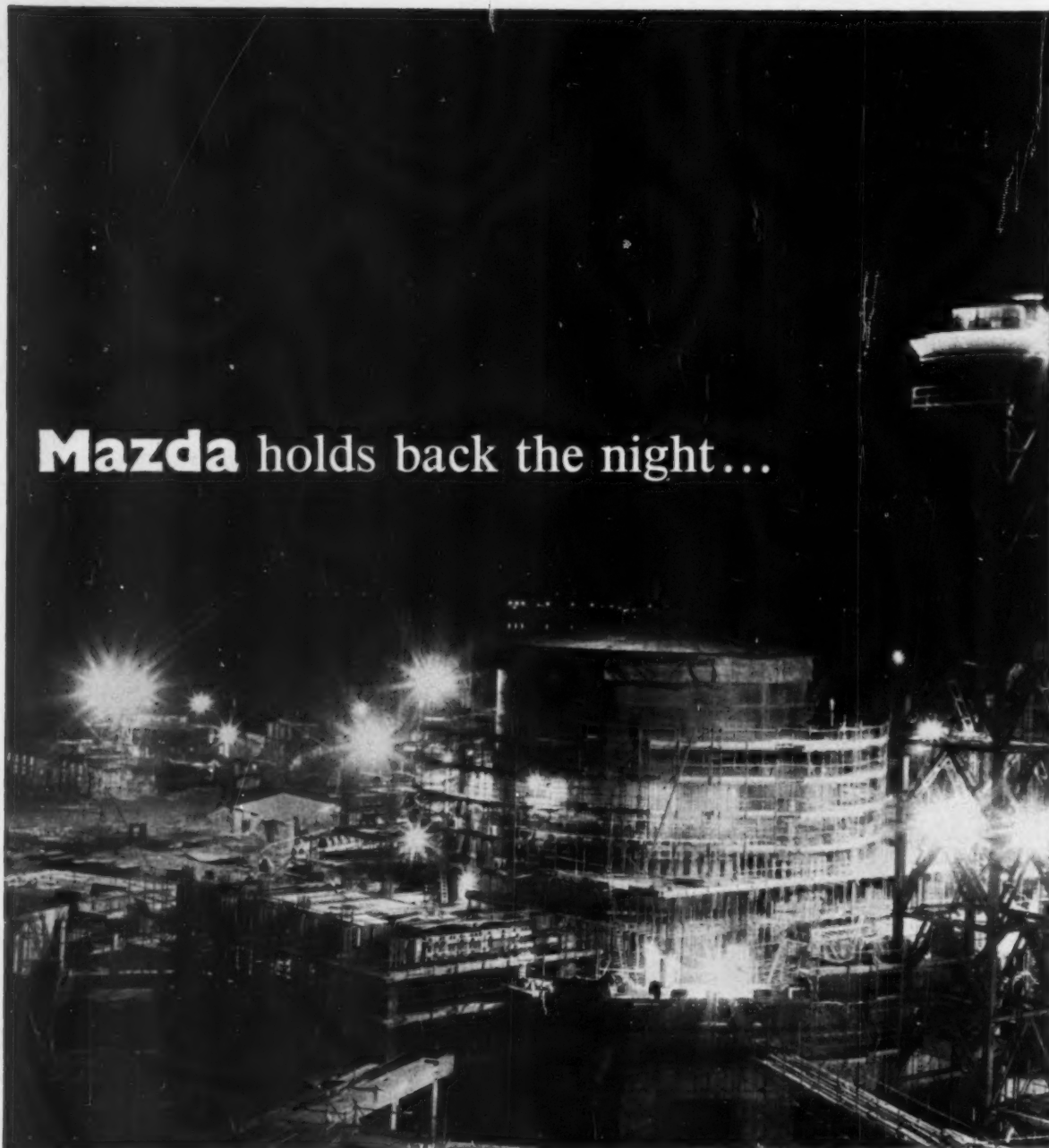
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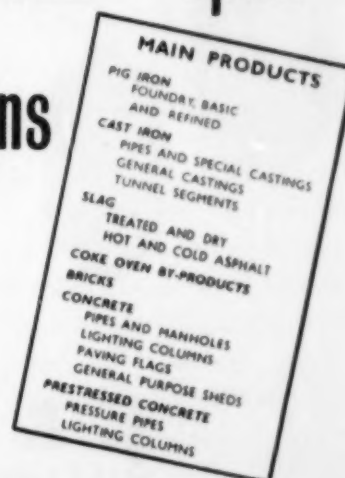


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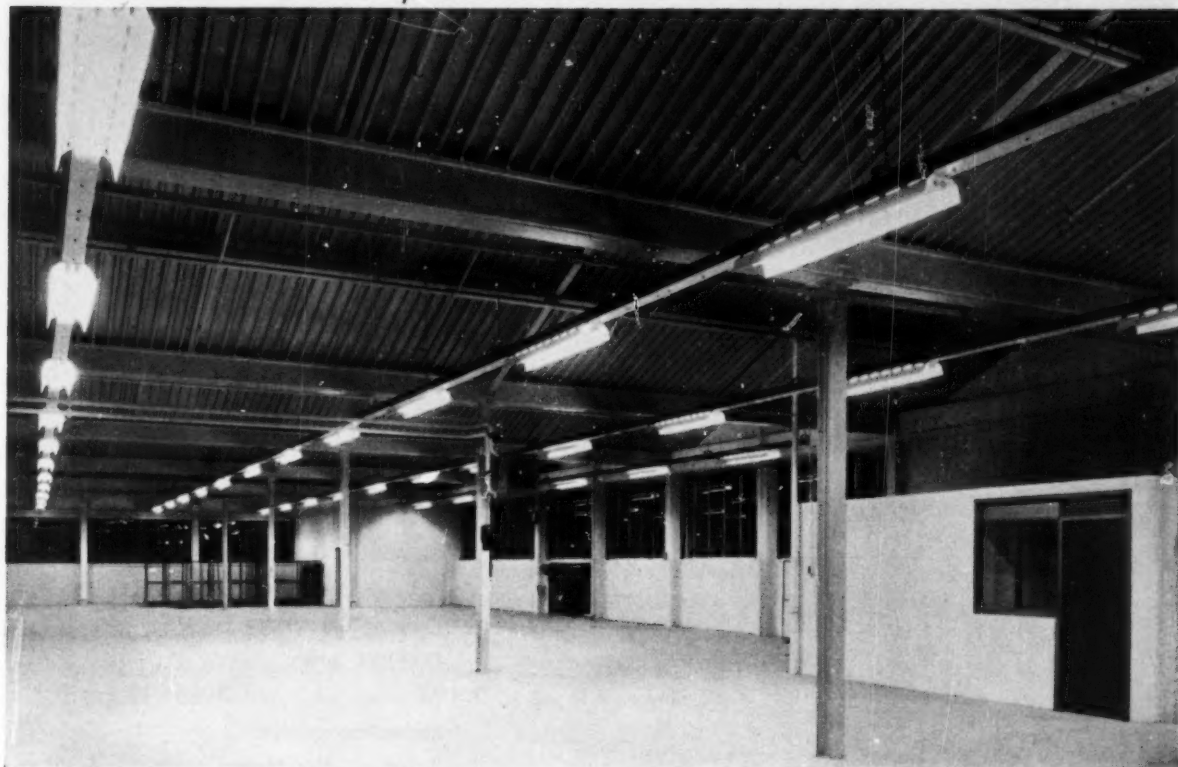
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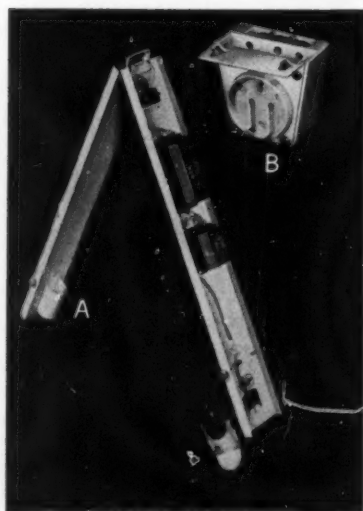
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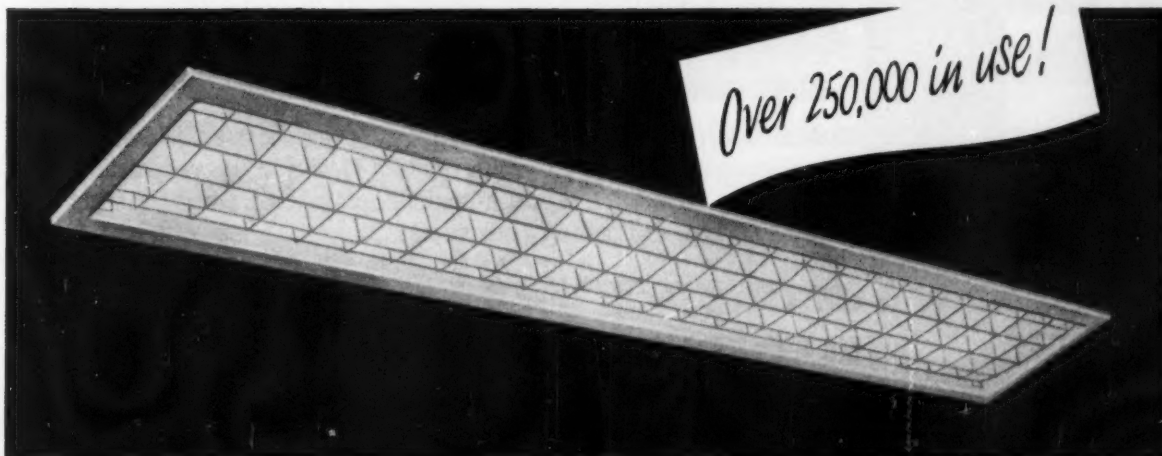
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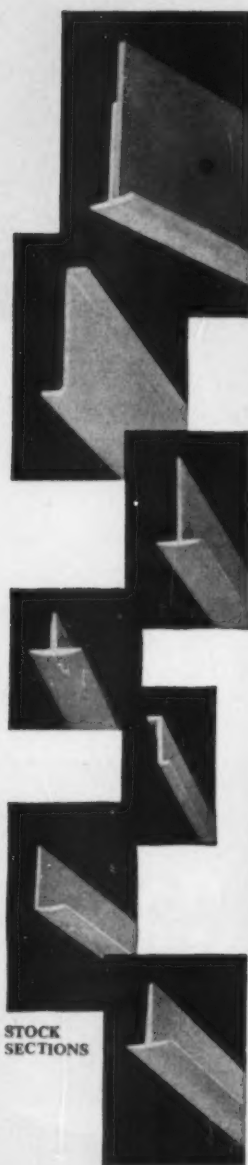
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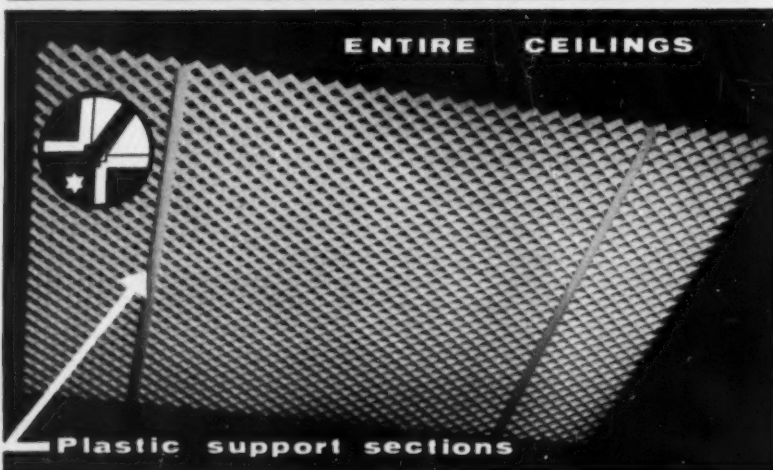
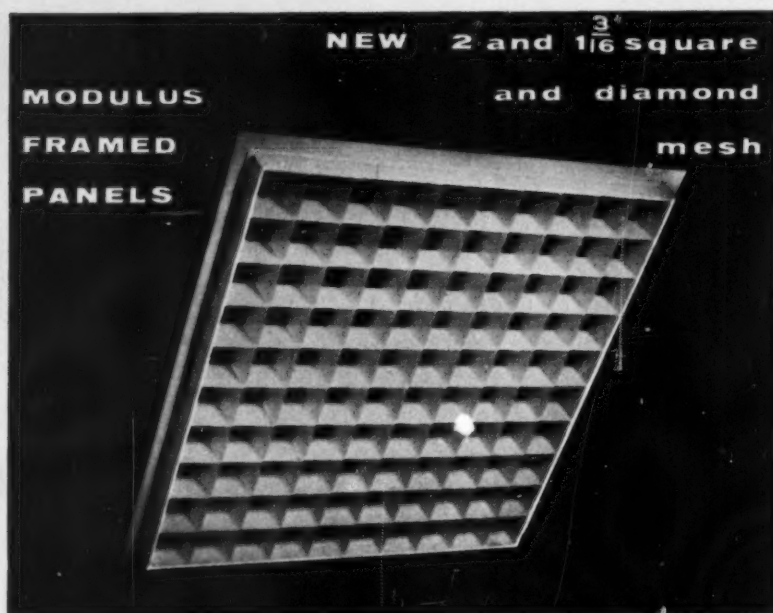
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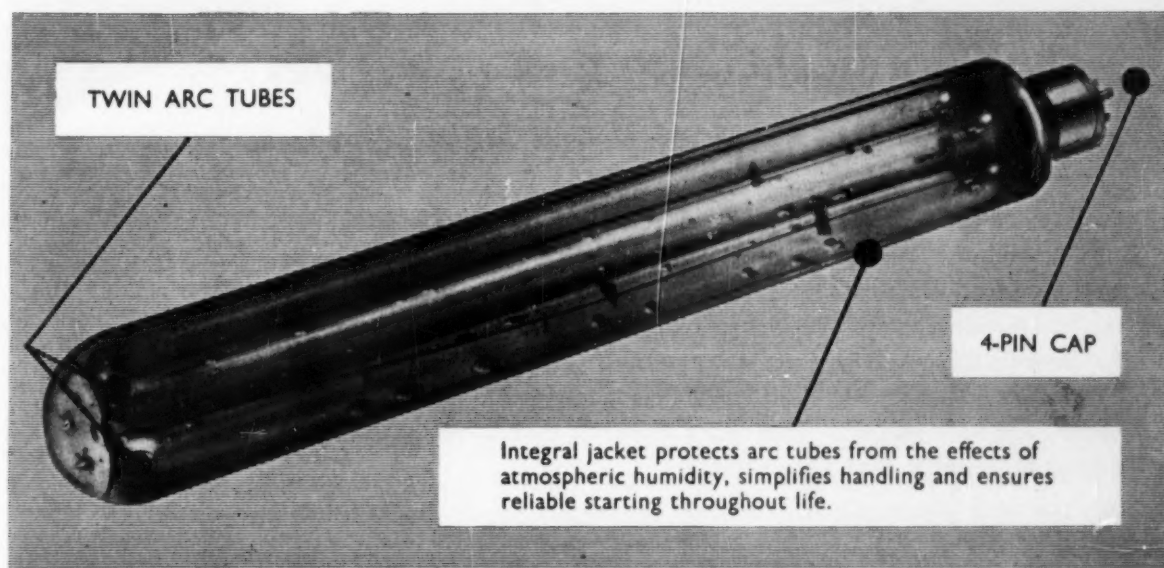
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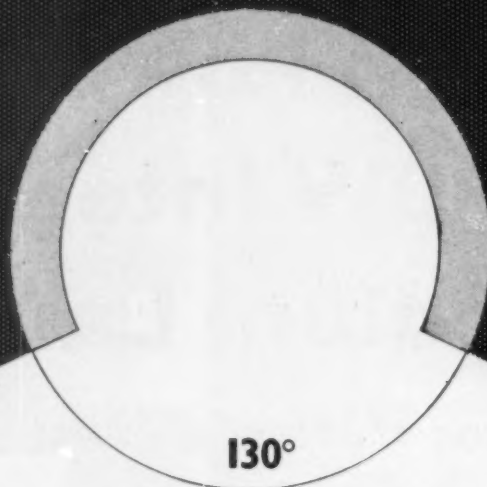
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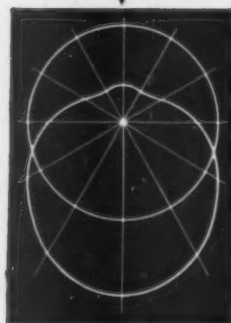


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Light and LIGHTING

Vol. 52.

No. 1.

January, 1959

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Our Lighting Industry

THE development of the lighting industry in this country has made possible great improvements in lighting practice in all fields of application. New and better lamps, new and better equipment for use with them and new and better lighting techniques have been made available time after time by this progressive industry. Extensive research has been supported for many years by some of the great member firms of the industry with the object of bringing within the reach of all sections of the public really good conditions of lighting. When the country stood in urgent need of industrial efficiency during the last war it was by the rapid organisation within the industry of a co-operative "all party" planning service that the necessary relighting of many vital factories as well as the proper lighting of new war factories was effected as quickly as possible. But the post-war years opened for the industry more and wider avenues for development and service to the public, and what has been achieved in these years gives ample reason for gratification. The lighting industry's constant support of the IES—which celebrates its Golden Jubilee this year—is also much to its credit.

Notes and News

THIS month sees the beginning of a very busy year for The Illuminating Engineering Society. In addition to all its normal activities, themselves fairly extensive for a society of its size, the IES has announced an even more formidable programme of Golden Jubilee events the intention of which, it states, "is to get across to the public, to industry, to civic and municipal authorities and others the belief of the society that lighting is an integral part of the welfare of the community, and to encourage a constantly better use of the resources that are ours".

This seems a very worthwhile objective of the IES in its Jubilee year. It is one which lines up with one of the objects of the society, which is "to disseminate knowledge relating to lighting and seeing". As we have had cause to mention before, the majority of people little appreciate the importance of lighting in daily life and few have ever heard of the IES, let alone the contributions it has made to the standard of living. Indeed, there are—we are sorry to say—even people in the lighting industry who do not appreciate what the IES stands for or what it has done. This being so—and you can take it from us that it is so—the IES would indeed have taken on a difficult task if it had set out solely to put itself over to the public next year. Instead, it is going all out to put over lighting—though in the process it will no doubt draw a fair amount of attention to itself.



The programme of Jubilee events has been published in an attractive brochure which is being sent to all members of the society throughout the world. Anyone reading this note who is not a member may get a copy by writing to us. In addition to the programme of lectures, conferences, exhibitions and displays, the brochure also gives a short history of the society; we will not enlarge upon this, however, as the next issue of *Light and Lighting* will give a very much fuller account of the society and its work during the past 50 years—and we can tell you in advance that it is a very readable account.

We congratulate the IES on the symbol it has adopted for its Golden Jubilee, and which appears on this page. The symbol, representing light in the control of man—or, if you wish, the guiding hand towards lighting for human progress—was designed by Gordon House.

IES Technical Report No. 1

The Technical Committee of The Illuminating Engineering Society has recently issued its first Report,* "Lighting in Corrosive, Flammable and Explosive Situations," a title which sufficiently indicates the ground covered. The subject is one of great importance in the rapidly increasing number of industries where a hazard exists owing to the employment of materials which produce a corrosive atmosphere or an explosive concentration of vapours or fine dusts in the air.

A glance at one of the appendices to the report shows how varied are the processes which give rise to such hazards. Corrosion occurs in chemical manufacture of many different kinds, in certain processes in the oil and gas industries, in steam locomotive sheds and in a number of other places. Fire and explosion hazards are present in cellulose spraying booths, in the manufacture of dyestuffs and in many industries where petroleum products and other substances giving off inflammable vapours are used. Mines and explosives manufacture are specifically excluded from consideration.

The report is divided into four sections, the two principal ones dealing respectively with corrosion hazards and with fire and explosion hazards. In each of these valuable advice is given on the dangers to be guarded against and the precautions to be taken. Some of the latter may appear to be simple common sense once attention has been drawn to them, but it is remarkable how frequently the seemingly most obvious points are entirely neglected, with annoying if not disastrous results. In addition to guidance on the choice of fittings and their installation, valuable advice is given on wiring systems and the special measures necessary, particularly where there is a corrosion hazard. Illumination values are not considered.

The section on fire and explosion hazards contains an excellent account of pressure-protected systems, both pressurised and air-purged. This is a fairly new development the use of which is likely to spread rapidly in the immediate future, especially where the hazard is due to one of the gases, such as hydrogen or acetylene, for which no approved flame-proof equipment is available. In such cases the only alternative to a pressure system is lighting by means of fittings placed outside the building, e.g. over roof lights.

The report has four appendices. The first, to

* IES Technical Report No. 1. The Illuminating Engineering Society, 32, Victoria Street, London, S.W.1. Price 5/-; by post 5/6d.

which reference has already been made, lists a number of practical examples of hazards, each accompanied by particulars of the lighting fittings used and of the wiring system adopted. The second gives an indication of the extent to which two different plastics much used in corrosion-resistant fittings withstand attack by a large number of different chemicals. The third appendix gives the four-group classification of vapours and gases with some informative comments, while the fourth contains an extensive bibliography. The report is well illustrated.

Colour Group Activities

It has long been known that the lens in the human eye is by no means perfectly transparent, but so far all measurements of its absorption have been made on a lens extracted after death. At the meeting of the Physical Society Colour Group, held on the 5th November last, Mr. F. S. Said, of the Institute of Ophthalmology, described some measurements he had made on the living eye by an ingenious, though very difficult, technique. When a narrow beam of light strikes the eye there is reflection at both surfaces of the outer coating, the cornea, and at both surfaces of the lens. The four images so formed are known as the Purkinje images, after the man who first studied them, and by measuring the relative intensities of the third and fourth images Mr. Said was able to find the transmission factor of the lens and to make some interesting deductions. He found that the transmission decreased with age from 20 onwards and that the transmission was higher for subjects with low general pigmentation (fair) than for those more strongly pigmented. Mr. Said's spectral transmission curves showed that the eye acted as a slightly yellow filter and he described the effect of this on the colorimetric "white point" of the observer.

To discuss colour phenomena in meteorology might seem at first like writing on the subject of "snakes in Iceland" but in fact at the last meeting of the Colour Group Mr. F. H. Ludlam, of the Department of Meteorology at Imperial College, spoke about coronae, haloes, mother-of-pearl clouds and the colours to be seen at sunset. He showed a number of very interesting colour films of cloud formations, speeded up some 50 times or more so that what would appear in nature as a fairly stable cumulus cloud was seen to be a turbulent mass of continuously changing form. After Mr. Ludlam's discourse Dr. J. Hallett spoke on the oriented growth of ice crystals on various crystalline substances, particularly cupric sulphide. The naturally occurring form of the sulphide, known as covellite, had the property of orienting ice crystals formed on its surface and causing them to grow as very thin plates. These plates showed interference colours which changed

with crystal thickness and revealed the micro-structure of the crystal surface.

A Lighting Showroom

New showrooms opened by Rotaflex in Conduit Street, London, W.1, are, not unexpectedly, a blaze of light. In a relatively small area, a large selection of the firm's lighting fittings are on display, though the restrained *décor* of the premises prevents the showroom from appearing overcrowded. At the official opening, one was, however, acutely aware of the heat output from the fittings: even with small lamps, the load is around 15 kW, which should adequately heat the premises on all but the coldest of days.

Perhaps the most exciting thing about the showroom—without being unkind to the designers, John and Sylvia Reid—is the cast-iron spiral staircase, now painted a gleaming white, which was uncovered during the conversion work. Notable also is a multi-light pendant comprising a cascade of 36 perforated stainless-steel cylinders which is suspended from an elliptical cupola. Designed specially for the showroom, this fitting, together with a similar 10-light cascade, is to be included in the standard Rotaflex range.



The new Rotaflex showroom.



Lighting at the rebuilt City Temple. The fittings shown house 500-watt filament lamps. Architects : Seely & Paget. (Troughton & Young (Lighting) photo).

Random Review of 1958

By A. G. PENNY

WE ALL KNOW that Nature is prodigal and most lighting engineers will no doubt have thought how prodigal she is in the matter of providing light but I am tempted to suggest that Nature is not all that generous. As I have said before, the human eye has surely evolved to suit its natural environment and it is only by the Grace of God that it puts up with the miserable efforts of man to imitate the sun. Just because we cannot make an artificial sun we should not be so silly as to pretend we do not want one. We may rightly be proud of our ability to work in a building without windows but to pretend that artificial light is better than sunlight is as futile as trying to persuade a traveller on the London Underground that the atmosphere there is just as good as the fresh air above ground. As a Cockney would say, "Come off it, chum!" We must not therefore overlook the importance of the research carried out recently by Dr. Blackwell at the Vision Research Laboratories of the University of Michigan on desirable illumination levels for various tasks; we must not scoff if some hundreds or even thousands of lumens per square foot are recommended for a particular task but rather deplore our own inability to provide what is required. The American IES is, I imagine, having a tough time reconciling Dr. Blackwell's work with what is today practicable and our own IES Code, with its highest minimum recommended illumination of 300 lm/ft² would seem to be well out of date.

Illumination levels in this country are rising both indoors and outdoors but I say in all seriousness that we have a very long way to go in both theory and practice before we can claim that we are giving mankind a square deal so far as artificial lighting is concerned. Obviously we cannot expect to jump from our present lowly standards to perfection in one bound; let us, however, keep our sense of values right and if our goal seems a long way off let us at least know what it is. Dr. Blackwell has spent many years developing his method of study and actually producing results; his work would appear to be of the very greatest importance and I hope to become better acquainted with it and its implications before the close of the CIE meetings next June.

Societies' Activities

The Summer Meeting of the IES at Eastbourne ran with the impeccable smoothness that we have learned to expect whenever the IES goes to Eastbourne. Part of the smoothness is without doubt due to the efficiency and unflappability of the Secretariat, but the other part can, I suggest, be attributed to the unobtrusive influence of the Area Manager of the South Eastern Electricity Board; when Norman Boydell is about, things get done. Comments on the papers presented at the Summer Meeting must necessarily be brief. I like the opportunity of hearing people put points of view which are new to me. I can guess what Ballin or Stevens are likely to say (though their presentations may contain some surprises) but am less sure about people such as Esko Paivarinne, Andre Boereboom or Grenfell Baines, so I enjoyed their contributions the more. Whilst the papers were at least up to the usual standard I begin to have the feeling that some change in the usual pattern is desirable. Three days devoted to only four or five aspects of lighting is not sufficient. Could we not have one day with a number of parallel sessions at which the specialists in their



Interesting modern design at the Institute of Marine Engineers, London. (Architects: Ronald Ward & Partners. Consulting architect: Victor Wilkins) (Troughton & Young (Lighting) photo).

The "spacious look" at Gatwick Airport. (GEC photo).



own narrow spheres could get together and talk over their own particular achievements and problems? They might then be persuaded to broaden their minds by attending the more general sessions on the other days. I make this suggestion because it seems to me that of recent years the specialist in the lighting world, whether manufacturer or user, has had very little reason to feel that he really must come to the Summer Meeting, so he slips into that useless category of those who know more and more about less and less.

Amongst the sessional meetings the one I felt most necessary was the paper by Gordon Scott on Lighting for Building Operations and Works of Engineering Construction. Consequently I was glad to see that, with Mr. Calvert, Mr. Scott gained the Leon Gaster Memorial Premium. We all know that lighting at present provided for such work is inadequate; we all know that building after dark is on the increase but I doubt if many of us realised just how inadequate present standards are. It's bad enough to be told that $\frac{1}{4}$ fc is reasonable for coal mining—we can appreciate that there are special difficulties in a coal mine—but it's just not intelligent to be content with similar standards on a building site, particularly when little or no attempt is made to control glare from unscreened light sources. Whilst listening to Mr. Scott I was reminded of the difficulties encountered by lighting engineers 30-40 years ago when they were trying to persuade factory managers that an unscreened local light over each machine was not the most economical way of lighting a factory. It is clear that a major effort is required to educate building contractors. I am glad to see that Mr. Scott is repeating his paper in a number of the IES Centres this winter and to learn that the IES Technical Committee is considering the publication of some recommendations on the subject.

Listening to Mr. Urquhart on Some Practical Considerations in the Design and Manufacture of Neon Signs I was struck by the thought that the lighting engineer who finds architects difficult should thank his stars that he's not in the sign business. Neon sign makers apparently have every man's hand against them, except that of the man who is going to have the honour of footing the bill!

The presidential address by Charles Smith revealed an aspect of his character which was, I suspect, not previously appreciated by the many who have been charmed by this cheerful and unassuming Liverpudlian. Few come to the presidential chair without some inner conviction of the contribution that light makes to life but many have failed to appreciate the difference between a presidential address and a sermon. Somehow, our new president managed to convey his own personal convictions so that I, for one, felt that his ideals were also my ideals. I was not being preached at, I was being talked with.

The Conference at the Northampton Poly (now a College of Advanced Technology) on Industrial Lighting showed how great is the demand for guidance from the factory engineer. Conferences of this nature fully justify the effort put into them by the members of the Society and more should be organised.

I am grateful for the editor's support, in the March issue, for my remarks last year about the professional status of the lighting engineer. All lighting engineers owe allegiance to their profession and this question of the profession of lighting engineers is the pith and kernel of our Society. In the long run their corporate existence is of inestimable value to everyone, including the commercial organisations, as so many recognise by their willing and generous support. (Not that I think that some of them

might not with advantage support the IES even a little more generously!).

I have stressed before in these pages that one of the most important functions of our Society is to provide a meeting place where those who have an interest in lighting can exchange ideas both formally and informally, and I regret that still we have no building of our own, as do the Royal Photographic Society, the Institution of Electrical Engineers, the Royal Institute of British Architects and countless other professional societies. In the words of the song, "be it ever so humble, there's no place like home," and, let us face it, our society is homeless and a society without a home is like a man with no fixed abode, it has no roots, no real unity. We cheerfully continue to accept the hospitality of the BLC the FBI and the RI; could we not mark our Golden Jubilee this year in some concrete way, however modest.

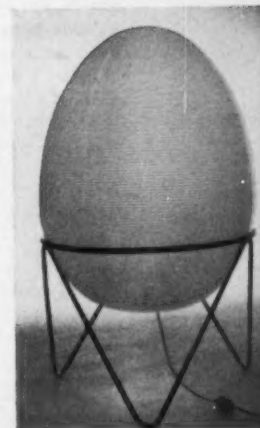
The establishment of the IES Diploma should help the recognition of the qualified lighting engineer. It is indeed a sign of the times that advertisements for jobs in the industry increasingly ask for men with Dip. IES. Nevertheless there is much to be done, not only amongst the manufacturing firms but more especially amongst the larger commercial firms who use light on such a vast scale. It would be of interest to make a list of organisations employing over, say, 20,000 employees who have not got a Diploma holder on their staff yet would never dream of relying on their supplier for technical advice in other matters. Many large organisations—even nationalised industries—have a multitude of lighting problems to solve in their own factories yet are content to rely on the necessarily biased advice of a supplier. This is a situation which further underlines the suggestion I made last year of the need for more independent consultants and I am glad to see that the IES is to devote an evening to this problem on April 21st. I hope this will be an occasion where those who employ lighting engineers as well as those who commission their work will come along and give their views. I understand the discussion will be informal and unreported so that nothing should trammel their speech.

Under this heading I include the activities of other lighting societies so now I will turn my thoughts overseas. I had not expected that the Association Française des Eclairagistes, at their meeting in Reims, would have devoted so much time to the subject of training lighting engineers. A major activity of the AFE on the occasion of their annual conferences is usually to demonstrate to the public the importance of lighting and although this was done very effectively at Reims it now appears that such activities are only one aspect of their conferences. Listening to the discussions at Reims I had a feeling that in a few years the standard and experience amongst French lighting engineers would be immeasurably higher. Can we say the same about our own country?

One of the special activities which attracted me at the AFE conference was the floodlighting of the exterior of the roof of Reims cathedral. It is a beautiful part of a beautiful cathedral which it is not easy to appreciate in daytime. Stopping at Reims later in the year, whilst on holiday, I was disappointed to find that it had been discontinued, leaving only the unimaginative floodlighting of the West Front to interest the tourist—such a pity! Whilst praising the exterior lighting of Reims Cathedral, I considered the lighting of the interior even more praiseworthy in its simple achievement. By lighting the immense gothic roof from the clerestory and leaving the rest in darkness save only for a spotlight on the choir there was created that atmosphere



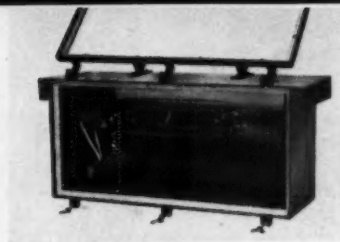
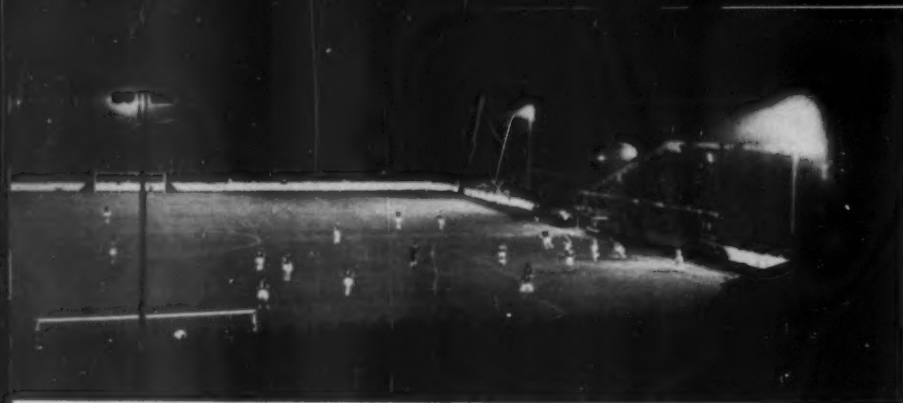
Lighting at the Wales Empire Pool, Cardiff. (GEC photo).



A "new look" in floor standards by Rotaflex. Height 39 ins., diameter 27 ins. (Rotaflex photo).

Salisbury Cathedral. (AEI photo).





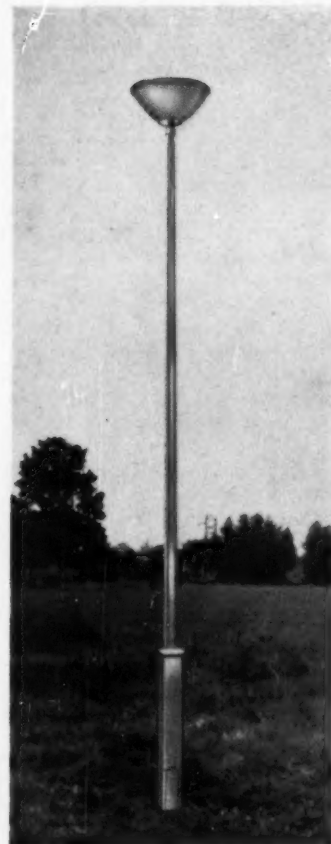
GEC "Economical" floodlighting at Barking Football Club ground. Above, the 2kw floodlight used. (GEC photos).

of majesty which only a great cathedral can evoke; the effect was further heightened by the exterior floodlighting shining through the stained glass windows. Ordinarily this effect only occurs as the sun rises or sets when, as every photographer and painter knows, so many things appear to acquire an added degree of beauty.

The receipt of some 30 reprints of papers presented at the American IES Technical Conference in Toronto reminds me of the importance of publishing the results of investigations even if the subject is a highly specialised one and even if the results of the investigations are by no means conclusive. I noticed a report on studies into the discoloration of plastics by radiation from fluorescent tubes which, it was hoped, would lead to an improved method of treatment, also a detailed article on the development of transistor circuits for fluorescent tubes; and an equally detailed study upon the merits of reflector type fluorescent tubes. These are all subjects of great interest to members of the British IES and upon which much work has been done in this country; it is a pity that British results have not been published in the journal which the British lighting engineer is sure to read.

Lamps

There is of course a good deal of delight expressed in many quarters when cartels, trade associations and the like are broken up. We should, however, beware of the all too facile assumption that nothing but good can come of such happenings. Competition is a spur and any organisation needs the application of the spur occasionally, but not all the time. Action and reaction in all directions simultaneously produce chaos, not progress; "gimmick" replaces technical innovation and a sense of irresponsibility enters the arena, quickly destroying the confidence of the buyer in the integrity of the seller. We are now far enough away from the dissolution of the old ELMA to appraise the immediate effects of that change, and I think it is true to say that the greater technical independence allowed by ELMA's successor, ELIC, has been a mixed blessing. Freedom to fit whatever cap a manufacturer likes to his fluorescent tubes has tended to force each fittings maker to ally himself with a particular tube maker. It is all a question of abuse of privilege and, whilst I support healthy competition and agree that a manufacturer should be able to make capital out of his technical achievements, I think that a mass of published figures, say for the efficiencies of fluorescent tubes, all differing by what are really insignificant amounts, merely confuses users and leads to unnecessary friction. If a maker can fairly claim 5 lm/W more than the rest let him claim it, and good luck to him, but to work up a sales campaign on a mere 1 or 2 lm/W brings the industry into disrepute. Nevertheless, whether we like it or not, the situation has changed and the cautious introduction of new ideas is now a thing of



An AEI "Leader" column. Made from three extruded sections of aluminium alloy; 15 ft. high, 30 lbs. The column and the "Ashby" lantern were designed together by Jack Howe. (AEI photo).



Lantern designed by Louis de Soissons for Welwyn Garden City, to take a 400-watt fluorescent mercury lamp. (GEC photo).

the past. It is to be hoped that after the first flush of freedom there will come a recognition that freedom without self-discipline is the freedom of the lunatic.

Standardisation seems to me to proceed at a snail's pace amongst a herd of galloping animals of every imaginable variety. By which I mean that by the time that we do agree on a standard design it is not what we want. Take fluorescent tubes, for instance. Twenty years after their introduction we have only just produced national and international specifications for switch start, standard colour tubes. Since the work of standardisation started switchless start, de luxe colours and reflector tubes have arrived; surely it is obvious that what we ought to standardise upon is not the plain ordinary outmoded type but the type that everybody is going to demand in the future. By no means everyone wants the poor colour rendering of the standard colour, the unreliability of a starter switch, or the extra cleaning of an ordinary tube as compared with a reflector tube. So let's try to get on with useful standardisation a bit faster. If standardisation does not keep up with the times it is sheer waste of time. We could do a lot worse than standardise on a de luxe colour reflector tube that will work on any circuit. Similarly, not everyone wants to buy a tungsten lamp with a big bulb. Let us find the smallest bulb we can use without detriment to the overall performance of lamp, fitting and wiring, then standardise on it until further advances justify another significant change in, say, 1968. Adaptors could always be used with existing fittings, although, to be brutal, it would not be a bad thing for all concerned if the majority of fittings now in use were scrapped. There are very few installations over five years old that are not now obsolescent, so rapid is the rate of development.

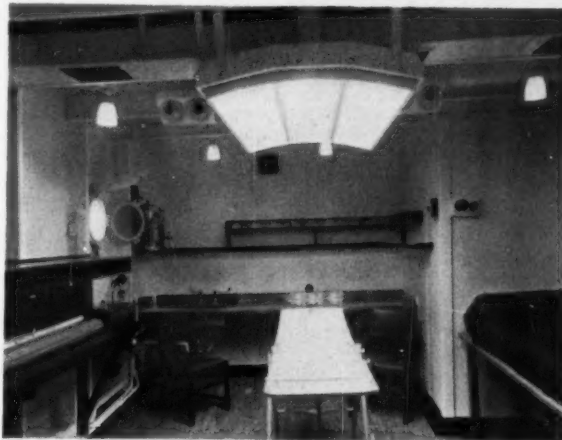
Lamp makers have to their credit been making strenuous efforts to reduce manufacturing costs without impairing quality. The nominal efficiencies of fluorescent tubes and mercury discharge lamps have crept up a little more this year and at least one firm has now mechanised the production of all ratings of quartz inner lamps which should eventually lead to even better and more uniform performance of mercury and fluorescent mercury lamps.

Several firms have been experimenting, and here I mean commercially as well as technically, with variations on the usual pear shape for filament lamps. Philips now offer their "K" bulb lamps and AEI offer their "Netabulb" (long e) lamps. GEC have been toying with the idea of making higher wattage filament lamps with parallel sided bulbs in order to reduce the surface area on which dust will collect. (Incidentally, research on dust collection by lamps is not as easy as one might think, and the problem of finding an artificial dust which will float in the air and settle and cling to surfaces in the same way as real dust is not a simple matter.) Quite what the virtues of the "K" and "Netabulb" lamps are I have not discovered yet, but they are, I suppose, a part of the trend towards smaller and smaller, hotter and hotter, brighter and brighter household lamps.

There have been some notable advances in projector lamp design this year. The expanding market for small still and motion projectors has whipped up competition among manufacturers, who at last are seriously concerned about such things as screen brightness, lamp design and lamp wattage. Gone are the days when it was tacitly accepted that only about a quarter of one per cent of the light from the lamp would reach the screen anyway. Osram in Germany have made a hit with their 12V 100-watt lamp which is designed primarily for 8 mm. cine projection and achieves an advantageous light distribution by having its single coil filament wound on a rectangular mandrel instead of on a conventional circular one. Philips in Holland have scored with their 8V



A filling station of The Regent Oil Co. near Dover. Ingenious use of a shaped aluminium reflector to increase the apparent source size. Three 8 ft. cold cathode fluorescent tubes are end-to-end under the top pelmets on each side of the "seagull" shaped canopy. (Ionlite photo).



Holophane operating theatre fitting on board a ship. (Holophane photo).

50-watt lamp, also designed primarily for 8 mm. projection, which incorporates two reflectors and is claimed, with certain projectors, to give as many lumens on the screen as a conventional 500-watt lamp. Unlike the American "Trufocus" projector lamp the Philips lamp does not have a separate reflector within the bulb but has the bulb specially shaped so that external silvering can provide the necessary light control. Actually, the Philips lamp has a spherical backing mirror in front and an elliptical reflector behind the filament. The backing mirror has an aperture in the centre through which the light from the elliptical one emerges. The use of an elliptical reflector does away with the need for a condenser lens between the light source and the film. Another development which is important and which was much in evidence at Photokina (the international photographic exhibition which is held every two years in Cologne) is the use of pressed glass bases on projector lamps which achieve "prefocusing" with considerable saving of space. Sylvania pioneered this development in America but now continental

manufacturers are taking it up and I note that manufacturers in this country are interested. We have put up with cumbersome caps and holders and inefficient designs for too long and I think the next few years may see something of a revolution in light sources for projection. If the makers of projectors wholeheartedly accept the inclusion of a transformer in their equipment it will give the designer of projector lamps much greater scope and eventually the user of the equipment greater satisfaction.

Mentioning cumbersome caps and holders reminds me that several British manufacturers have this year introduced miniature lamp Christmas Decoration Sets designed on the lines of sets which have been imported, mainly from Italy, for some years. There is no doubt in my mind that the very much smaller bulbs, which are capless, are much more suited to the small modern Christmas tree than the 20V 3-watt and 6-watt bulbs with MES caps that we have tolerated in previous years. Some sets have the advantage that if a bulb fails a fusible link operates within the bulb and maintains the circuit, thus making it easy to see which bulb has failed.

The increasing use of low voltage portable hand lamps must surely be a good thing, both from the cost of bulb replacements and from the safety angle. Some greater agreement upon what is the best voltage would be valuable and in this connection I noted in the *Electrical Review* a reference to the standardisation by Imperial Chemical Industries Ltd. upon 50V. Lamps for such voltages have short filaments and there is an opening for properly designed reflectors in place of the present devices which are in general only shields; they are also considerably more efficient than 240V lamps.

Cold cathode fluorescent tubes are still highly valued by those users who wish to "fit and forget". Many are to be found on railway stations, and I suspect that they may yet find wider application for street lighting. To meet the demand for more light, Ionlite are now offering 25 mm. tubes to operate at 150 ma.

Atlas have marketed a 5-ft. 150-watt white high output fluorescent tube, of reflector type, for which an initial (100 hr) output of 7,050 lm is claimed. The tube has, however, a relatively short life and a very poor output maintenance. Although the initial output is little short of that of a normal 8-ft. 125-watt tube, an average output to 2,000 hours of only 4,800 lm is claimed, which is not very much greater than the average output of a 5-ft. 80-watt tube during the first 2,000 hours of its life. Thus the useful life of the Atlas VHO/R tube may be well under 2,000 hours and for the present at any rate I think we must regard such tubes as "specials" for use only where their physical size is an advantage and their short life can be tolerated. We should remember, however, that ordinary fluorescent tubes when they were first marketed had a life of only 2,000 hours, and even that is twice as long as is usual for a filament lamp.

At odd moments we have seen mention of "atomic lamps" in the press. Though such lamps are academically interesting they have as yet found hardly any applications; their brightness is low and they are expensive. Krypton 85, one radio-active gas being used, is a by-product in the operation of atomic piles and has a half-life of about 11 years. Most of the emission from Kr85 is β radiation but some is γ radiation, and I do not think the general public would take kindly to lamps using this or any other radio-active substance in spite of assurances from the experts that under normal conditions of use no harm would befall.

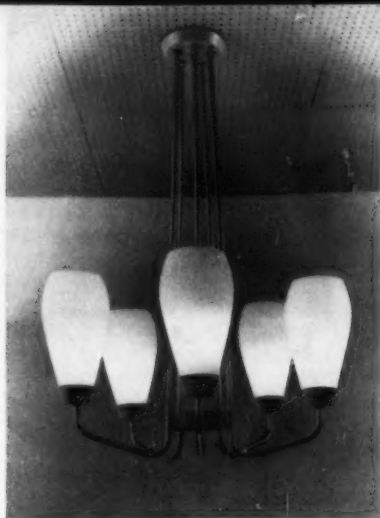
I note that xenon discharge lamps were much in evidence at this year's Photokina. Most manufacturers of cinema projectors were showing serious interest and I had the feeling that this type of lamp really would take over from the carbon

arc. As might have been expected most of the xenon lamps on show were of German Osram manufacture and the Germans are undoubtedly to be congratulated on their pioneer work on this development and the very high standard of workmanship which they have attained. Philips sprang a real surprise by exhibiting a mercury discharge lamp for pulse operation which looked most promising and was said to be equivalent in performance to a 60-amp high intensity carbon arc; the colour is reported as "more than adequate". They call it the 800-watt SPP lamp; it is physically small—only about 80 mm. long and 6 mm. in diameter. It is presumably quite cheap but as yet would appear to have a rather short life, 33 hours being quoted for full load operation. The idea of pulse operation of the light source in film projection is not, of course, new but has attracted little attention for some years past. It cuts down power consumption, thus reducing heating problems in the lamp and lamp-house and does away with the need for a shutter. Philips have arranged that their lamp shall be pulsed 72 times a second, which means 3 pulses per frame. At the risk of provoking remarks about grandmothers, I will add that the projecting of each frame more than once is common practice even with shutter type projectors and is merely a dodge to raise the flicker frequency well above the noticeable limit without increasing the number of frames and thus the length of film required. I am attracted to the pulsed type of lamp as I think it may offer higher screen brightness and a greater measure of economy than the continuous burning type.

A very convincing demonstration of German equipment was staged earlier in the year by Productakin Ltd. at the Warner theatre in Leicester Square when identical 35-mm. colour films were projected alternately with the carbon arc projector normally used in the theatre and a German Bauer projector equipped with a 2-kW German Osram xenon lamp. Although the change-overs were fairly obvious, because of the slight difference in colour rendering, there was no marked change in screen brightness or brightness distribution; the eye very quickly adapted to the new colour balance and either source was perfectly acceptable. Personally I had a slight preference for the cooler, fresher colour rendering of the xenon lamp, especially in outdoor scenes, but I realise, of course, that if xenon lamps come into general use the colour balance of the films themselves would be adjusted to give whatever colour effects the directors thought best. AEI Lamp and Lighting report progress with their 2-kW xenon lamp, and I am given to understand that quite a few small and medium sized British cinemas have already given up carbon arcs in favour of xenon. It is apparently not a very difficult conversion and as AEI market projectors they are well placed to undertake a development of this kind. Where a concentrated source is required xenon is being increasingly used—both in high wattages for film projection and in low wattages for use in scientific instruments. In other fields the possibility of really large units with perfect colour is attracting attention. The production of a 65-kW xenon lamp in Germany opens up new ideas about area lighting.

Exterior Lighting

I think that the most significant trend in street lighting in this country is that towards raising the standard above that set out in the Code of Practice—which is understandable when one remembers that the Code is based on what was considered good practice over 20 years ago. Some of the principal street lighting authorities, notably the larger London boroughs but also some provincial authorities, are now thinking in terms of 10,000 to 30,000 lumens below the horizontal per 100 ft. of carriageway for important thoroughfares in "central areas". Many will have studied



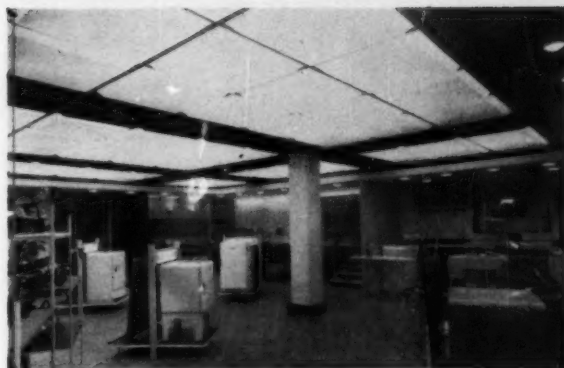
"If they project into a room they must be decoratively good." An example from the SLR range. (SLR photo).



Some of the 17,600 square feet of Lumenated Ceiling at the new factory of Foxboro-Yoxall Ltd. at Redhill. (Lumenated Ceilings photo).

with interest the small yellow covered booklet prepared by the Association of Metropolitan Borough Engineers and Surveyors entitled Practice Notes for Street Lighting in London. With the demand for more light goes the recommendation of shorter spacing which although perhaps detrimental to the daytime scene is unavoidable with the present range of lamps and lanterns. So far as the lighting of the most important shopping or business centres is concerned I think we are witnessing a gradual change from the economical silhouette vision system to the normal system whereby objects are viewed by virtue of the light they reflect rather than the light they obstruct. My guess is that before long street lighting engineers will be talking much more in terms of foot candles.

For many years there was a great deal of scepticism about American claims to have established a correlation between road accidents and bad visibility. It may be said at once that the evidence, viewed in a rigorously statistical manner, did not seem very conclusive, yet one never met a street lighting expert, American or otherwise, who did not believe firmly that better lighting would make the roads



A Crompton "Modulume" ceiling at the showrooms of Morphy Richards Ltd., Conduit Street, London. 5 ft. 80-watt tubes provide 50-60 lm/ft²; black panels have been used to give a decorative effect and to disguise some heavy beams which are just above the suspended ceiling. (Crompton Parkinson photo).



Local lighting by a suspended luminous ceiling at the Midland Bank, Piccadilly Circus. (Philips Electrical photo).

safer, even if he could not prove it. Looking back it now seems very odd that British engineers did not make greater efforts to establish some reliable evidence, especially when it was always recognised that if the case were proved the justification for more money for street lighting would be immeasurably strengthened. I think it is true that until comparatively recently British research into street lighting has been concentrated almost exclusively on the purely technical problem of providing better lighting for less money. Britain today, as Harry Carpenter pointed out two years ago, is spending a smaller proportion of the national income on street lighting than ever before. Now, however, evidence is at last being produced (largely as the result of patient research by the Road Research Laboratory) which establishes beyond all doubt that good street lighting will save British lives, and with acceptance of this in government circles there is quite clearly an intention to do something about it. It is little use regretting lost opportunities but it may perhaps be remarked that if industrial research laboratories had before the war spent their money on doing what the RRL has now done, rather than on research into new



Spun copper chandeliers with silver bronze finish at the new Central Synagogue in Great Portland Street, London. The larger ones are 9 ft. 6 in. in diameter. (Designer: L. W. A. Davis). (Atlas Lighting photo).

lamps and lanterns thousands of lives might well have been saved and tens of thousands more lanterns sold.

The co-ordination of local authorities as regards street lighting for which Granville Berry, this year's APLE president, has been campaigning can now be seen as an essential administrative step towards a proper utilisation of public monies and will surely proceed more quickly now that the public is prepared for more money to be spent on street lighting. A continued effort will, however, be necessary to keep the public in this frame of mind for, with so many public services demanding a greater share of the public's purse, it will be all too easy for our little baby to have the bottle whipped from its mouth before it has even had the first suck. As Mr. Robinson said we must continue to believe in the willingness of the public to foot the bill for good street lighting.

Once again the APLE has served as a platform from which to remind people that public lighting does not only consist of street lighting. This time the point was made by Mr. Kalff who reminded us, *inter alia*, that it was not only old and historic buildings that could be floodlighted; modern buildings, bridges and even abstractions in the park could also be treated. From a purely technical point of view I thought that a remark by Mr. Grundy during the discussion of Mr. Kalff's paper was most significant. Mr. Grundy drew attention to the segregation of pedestrian and motorist which is to be seen in new residential areas and it may be that the lighting of towns and cities in the future will be for the benefit of the pedestrian rather than, as now, for the motorist. This opens up a new line of approach particularly as in these new places the pedestrian generally has greater freedom of movement; he is no longer confined to a fore or aft direction, up or down the street, but is free to move in any direction. His field of view is therefore

quite different from that of the motorist. It might be thought that the problem is essentially one for the interior lighting engineer but rendered more difficult than usual because there is no roof from which to hang the fittings. I think, however, that the problem is more complicated than it appears, particularly since an aesthetically satisfactory solution has to be found; in these new places the whole concept is one of aesthetics allied to utility—and unsatisfactory lighting just will not be tolerated. Whilst on the subject of the APLE conference I must say how forcibly I was reminded by the contributions to the symposium (Boereboom, Gaymard, Trappen and Zijl) that the British will have to wake up if they are to continue to be able with justice to claim the best street lighting in the world.

Two years ago I remarked that the developments by Philips and Osram in sodium lamp design would be sure to stimulate further developments. This was of course an easy forecast but it is nevertheless gratifying to note how quickly further developments have come along. Philips have now shown an ingeniously simple integral version which is claimed to give some 10 per cent more light than the Osram type. If such advances can be coupled with a good lumen maintenance and freedom from failures before 4,000 hours a useful step forward will have been taken.

The Osram integral type sodium lamps have been steadily increasing in popularity as authorities have learned to value their reliability and a 280-watt lamp, with an output comparable to that of a 400-watt mercury lamp has recently been added to the range. The possibilities of the 280-watt lamp have not been fully explored yet but it seems that, as with the 400-watt fluorescent mercury lamps, it may be necessary to design lanterns especially for the new lamp in order to make the most of its higher output. The 280-watt lamp is essentially two 140-watt lamps in one outer bulb and as it has the same external dimensions as the 140-watt lamp there is a great temptation to put it into a lantern designed for the 140-watt lamp. The light distribution from the 4-limb lamp is however not quite so suitable as that from the 2-limb lamp which is already half way to a reasonable distribution for street lighting, and there are problems connected with the housing of the second auto-transformer required by the 280-watt lamp. Nevertheless, if you have a 140-watt installation which needs improvement and you have not much money, simply to change to a 280-watt lamp and strap an extra transformer on to the pole may produce the answer.

The design of street lighting columns has continued to command attention; the general trend is towards slender and still more slender columns. I note that GEC are now offering steel columns which taper steadily instead of in steps and that AEI have produced a very light weight pole for Group B lighting which is made by cementing together with an epoxy resin three extruded sections of magnesium aluminium alloy—a technique calculated to shock old-fashioned designers.

Flashing pedestrian beacons get no easier to see as they become more opaque with age and grime. Moreover, with the persistent tendency to replace gas by sodium in residential areas there disappears the colour contrast which was one of the reasons for choosing yellow beacons. Surely in a sodium lighted street there must be a case for white beacons, if beacons are all we can afford. A worse situation applies on some traffic routes. Recently on a crowded dual carriageway I could see 18 amber lights and 11 red ones in front of me; it was quite a surprise to realise that the change to 17 amber and 12 red meant that I should stop.

Remembering all the furore last year in north-west London about the colour of street lighting in residential areas I was intrigued to notice that Hampstead Borough Council are to install fluorescent mercury lighting in some "special" neighbourhoods. Why, however, subject the less fortunate inhabitants of Belsize Road and Haverstock Hill to sodium just because they live in less attractive surroundings?

Outdoor lighting is now becoming a well developed technique. The lighting of the larger football grounds started the ball rolling, and now railway marshalling yards are taking up the theme. I never realised how many marshalling yards there were until someone went through the list of collieries, power stations, factories and, of course, British Railways yards which had already been lighted. I note that GEC are now offering smaller, relatively inexpensive tower systems, suitable for the amateur football clubs which now wish to follow the lead of the larger clubs in playing and practising in the evenings. The GEC "Economic" floodlighting system for Barking FC was even more economical than it might have been because much of the installation work was carried out by volunteers from the supporters' club. It must have been a tonic to see skilled men, for there is nothing "amateur" about the installation, working gladly without pay in the evenings and at weekends during the summer. The word "volunteer" has, I think, been slipping out of the English vocabulary since 1914—let's try and put it back. Oh! I forgot to tell you about the technicalities. The ground at Vicarage Field, Barking, Essex, is lit by twenty 2-kW floodlights mounted at a height of 33 ft. on six concrete poles, one behind each goal and two on each side of the field. It makes an interesting comparison with the Atlas installation at the Newcastle United FC ground where 180, 2-kW floodlights are mounted on four 197 ft. towers.

The floodlighting of Salisbury Cathedral was interesting because it was so like the lighting of a football field. Upend a football field and the lighting problem is rather like that of floodlighting a cathedral. Instead of lighting the ground with fittings on towers, they lit the tower with fittings on the ground. AEI actually used their narrow beam football field floodlights to light the spire and their wide angle football field floodlights, the ones they mount on the roof of the stand, to light the façade of the cathedral.

Slowly the cities and towns of England are awaking to the commercial benefit of a tourist trade and are giving some thought to what the tourist can see when he arrives. At present what can the tourist do after the evening meal if he takes a holiday in the autumn? A little exercise up and down the half dark main street, a short drink and early to bed is no way to round off the day. If the city's architectural beauties were suitably floodlit or perhaps had a modest *Son et Lumière* the evening would have a purpose and a profit. I was glad to see that Oxford City Council this year kept some of their floodlighting on until the end of October. The use of light for decorative or pleasurable purposes is a proper duty of municipal authorities, whether it be fairy lights on the promenade or the floodlighting of the Town Hall. No city or town in these isles would accept the allegation that they were lacking in local pride yet one has only to cross the Channel to realise that we are sadly lacking in the matter of presenting ourselves to the world. Surely of all the methods of publicising a place, floodlighting must be the cheapest. I estimate that the truly spectacular lighting just installed at the Eiffel Tower in Paris will cost only a few pounds per night to run. We may perhaps hope that the Golden Jubilee of the IES will stimulate some action in this country. Public lighting engineers, please

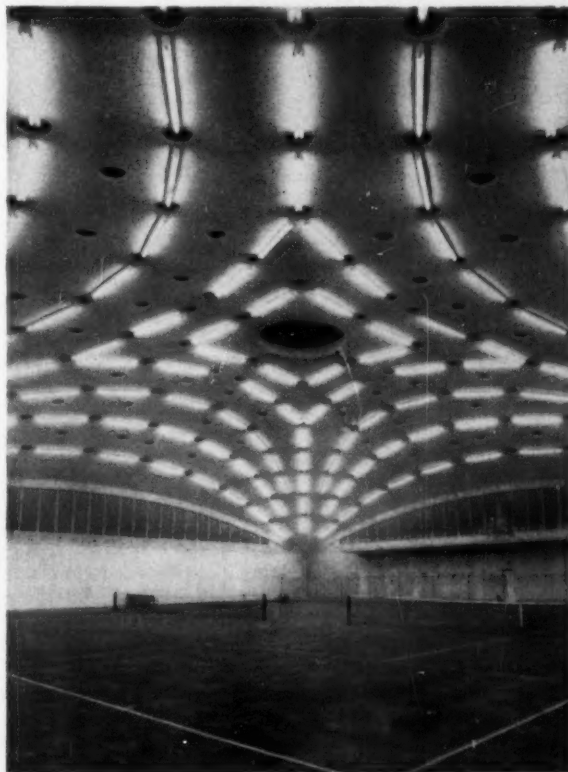
go and see your town's publicity manager and sell the idea to him. (Are all aforesaid engineers members of the IES? And why not?)

The pattern of lights on the aerodrome runway is ever changing and it is now quite the done thing to have lights near the centre of the runway where impact with an aircraft wheel is a regular and not just an occasional occurrence. This change has led Holophane to design a range of runway lights which are more robust than any I can remember and which, whilst providing adequate intensity at the correct angles, project only $\frac{1}{4}$ in. above the ground, or what is really more important have an above ground volume of only about 24 cu. in. One installation of these new lights is at Gatwick, but a number of other installations are being put in.

British Railways are, as everyone knows, going ahead with electrification of the main lines and I was interested to hear about the special BICC train which is used in the erection and maintenance of the overhead cables. Falk Stadelmann, who seem to take a special interest in the railways, have mounted floodlights equipped with fluorescent tubes along the roofs of the special coaches which enable the men standing on top of the coaches to work at night. A rather peculiar working plane, don't you think.

An interesting instance of lighting helping agriculture tickled my fancy. The smooth running of A. G. Limfield's 1,000 acre mushroom farm at Thakeham in Sussex depends very much on the output of the two specially designed dung-turning machines. By having seven 1,000-watt floodlights

An interesting pattern of 8 ft. 125-watt fluorescent tubes at the All England Lawn Tennis and Croquet Club, Wimbledon. (Philips Electrical photo).



on one side of the open yard and seven 500-watt floodlights on the other, these machines can be kept working by night as well as by day. This eliminates the possibility of a bottleneck in the complicated cycle of operations which involves thousands of pigs, millions of pounds of mushrooms and has for by-products roses, carnations and orchids. The output of the farm is expected to reach about 9 million pounds of mushrooms a year.

I must confess that I have not patronised any of the several *Son et Lumiere* shows put on during the summer but I have seen the very handsome spotlights which Atlas used to light the towers of the Royal Naval College at Greenwich. A group of four 24V 150-watt spotlights floodlit each tower from a distance of about 400 yards and I am told that the effect was very satisfactory. *Son et Lumiere* must have something in common with shop window lighting.

One man's meat is another man's poison and an enterprising lighting engineer should keep an eye on the scrap heaps. Anyone who has visited the new restaurant called "Talk of the Town" near Piccadilly Circus cannot have failed to notice six nostalgic street lighting lanterns in the entrance hall which were rescued, just in time, from the Finsbury Borough Council's scrap heap. So pause a moment all you street lighting engineers before you cast away your old lanterns; if they have artistic merit there may yet be someone to appreciate it. Whilst writing about the "Talk of the Town" I cannot help mentioning the "sputnicised" lamps which are being used in the chandeliers. The idea is by no means new in America, but this is the first time I have come across this form of lamp here.

Interior Lighting

Lighting design methods are under review and everybody will have noticed the two important contributions to Vol. 23, No. 2 of the *IES Transactions*—one by the Lighting Design Data Panel of the IES and the other by Mr. Waldram. The LDD Panel advocate the Zonal method of calculating coefficients of utilisation developed by Jones and Neidhart of the United States which no doubt has advantages over the tables of Harrison and Anderson with which we have been at home for so many years. Mr. Waldram's paper was on the subject of his Designed Appearance method, and may I say in passing how much I enjoyed his description, in the written discussion of his paper, of "the road to luminance design". I feel impelled to urge all members to study these contributions in as much detail as they can comprehend. Lighting engineers will, of course, give them special attention, but others should read them if only to realise that lighting design is now about to become much more complex than heretofore. Properly applied the more complicated treatment will produce results now only arrived at by luck or trial and error and we can therefore hope for a substantial advance in the standard of lighting engineering and more recognition for the qualified lighting expert; that individual will, however, need to be more competent than many who now regard the possession of an IES Diploma as the hallmark of their profession. Almost as an aside might I remark that I would make the reading of Percy Corry's book "Lighting the Stage," compulsory for every would-be diploma holder and, talking about books to read, may I recommend "The Social History of Lighting," by W. T. O'Dea, of the Science Museum, a most interesting and readable book. Do you know what light was used in an operating theatre 2,500 years ago, or how billiards tables were lighted in 1763?

Where lighting fittings are not to play an important decorative role there is now a strong tendency to recess them

in the ceiling—flush mounting is often not good enough, they have to go right into the ceiling. A sense of spaciousness is worshipped and areas of dark ceiling are not unduly criticised. Suspended ceiling systems are becoming more and more popular and most of the larger firms have their own pet versions; in fact, ceiling treatment is on the verge of becoming a separate branch of lighting (almost a subject in which one might specialise) and the transfer of responsibility is marked. In the past the builder was responsible for the ceiling but now the responsibility can and increasingly often does rest with the lighting engineer. Luminous ceilings are especially suitable when high levels of illumination are required; they minimise glare, avoid an untidy forest of fittings, ease installation and maintenance and give flexibility. This last item, flexibility, merits a little further elaboration because it embraces not only flexibility from the point of view of getting light where you want it but also from the point of view of decoration. Although luminous ceilings need not be large in area they often are and in a large interior the ceiling takes up quite a large proportion of the field of view, so it behoves the designer of luminous ceilings to remember the importance of their appearance. The question of their appearance is an artistic one and on such matters it is unwise to lay down hard and fast rules so I will merely draw attention to some of the methods used to introduce a brightness pattern. First, there is the possibility of arranging luminous and non-luminous areas and here I think the secret may be to limit the dark areas to just what is necessary to provide the required decorative effect and not regard the luminous panels as just so many lighting fittings. Second, there is the possibility of having moulded or painted patterns on the luminous panels themselves; for example, Atlas Sylvalume panels have a pattern in one corner and I note that Lumenated Ceilings have just introduced a "Lumenated Pyramid Ceiling" in which the panels are embossed with pyramids which change their appearance with angle of view. Third, coloured panels can be used to give a very strong decorative effect. Most panels, which are usually of "Perspex" or a vinyl plastic, are easily changed and this allows the pattern to be altered as and when the occupants feel the need of a change. Personally, I view with disfavour the plain luminous ceiling which provides a monotonous uniformity from wall to wall; it can undoubtedly provide the foot candles but is aesthetically dead and it gives that flat type of lighting which we associate with indirect lighting.

I seem to detect a swing away from louvres towards plain, more easily cleaned, diffusers. Vacuum formed vinyl plastics may help the trend, for these whilst not perhaps so rigid as "Perspex" are much cheaper and thus particularly welcome for the luminous ceilings just mentioned above. I note, however, the two elegant new injection moulded polystyrene louvres which Harris & Sheldon (Electrical) have introduced, called Luveline and Paragrid-Tile. The latter is a fine mesh egg-crate type of louvre suitable for use in large or small suspended ceilings; the small size of the cells gives the panels better obscuring properties than larger cell louvres and a general appearance that is not so very different from that of a plain diffuser. I can imagine that in dusty or insect ridden places the Paragrid-Tile might well have marked advantages over the plain diffuser.

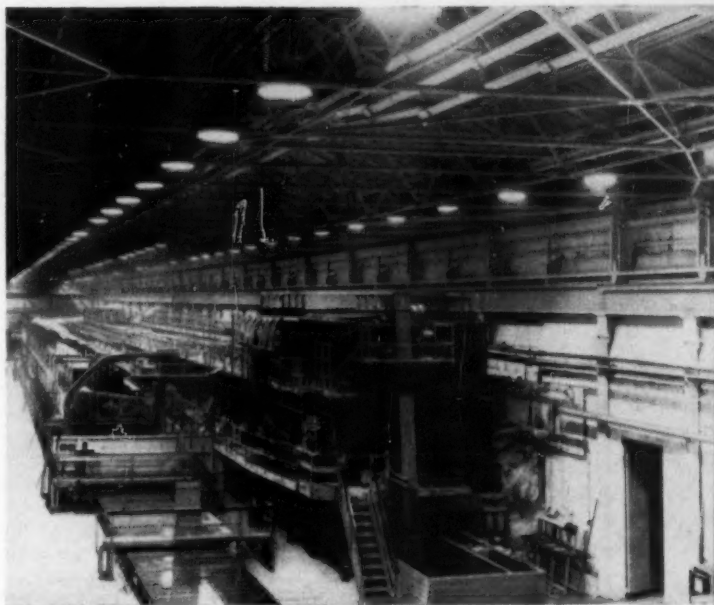
Fittings are now well and truly in ranges. This year we have had the Ekco "Essex", the GEC "101" and the Falks "Summit", to mention just three new ranges of fluorescent fittings. Some firms, however, are turning considerable attention to special requirements. AEI, for instance, now have not only their well known "Watershed" fitting but also

a completely submersible 5-ft. 80-watt fluorescent tube fitting which is quite happy under either fresh or salt water and being only 2½-in. in diameter can be easily tucked away in crevices cut in the falls of graving dock basins and elsewhere. Light distribution control can be effected when necessary by using reflector type tubes; control gear is mounted remotely. AEI have also brought out a new dust-proof 5-ft. 80-watt fluorescent fitting for use in collieries, textile mills and timber mills.

In shop lighting I have noticed the increasing use of low voltage spotlights to obtain greater peak intensity or, in other words, a more concentrated beam than can conveniently be obtained from normal GLS lamps with their relatively large source size. The need for higher intensity spotlights is greater today because of the higher level of general illumination in shops. An alternative advantage of the low voltage spots is that where the general illumination is not too high they can be placed further away from the display and thus help to satisfy the modern craving for spaciousness. I note that Philips are marketing a 24V 100-watt bowl silvered reflector lamp which with the 8½-in. diameter reflector of their high intensity narrow beam spotlight gives a maximum intensity of 62,000 candelas. For comparison, I would mention that when the reflector is equipped with a 230V 100-watt lamp the maximum intensity is only 10,000 candelas. Like Courtney Pope with their 12V 48-watt spotlights, Philips take advantage of the fact that anodised aluminium reflectors can be coloured to give a coloured spot. Also on the subject of shop lighting, Courtney Pope have introduced an ingenious and very versatile device which they call a "Mobilyter". Briefly, this is a slender extendable rod on which are mounted several spotlight fittings; the spotlights can be swivelled as may be desirable and the rod can be extended until it wedges itself between the floor and the ceiling.

Many Londoners may well have been excused for thinking that the British Lighting Council was flogging a willing horse when they heard that their first campaign was to be on shop lighting. With all the modesty of a born Londoner trying not to sound too superior, I can say that there is not a lot of scope for such a campaign in London or its suburbs. More and better lighting is needed in London but there is no need to spend money convincing the London shopkeeper of the desirability of a brightly lighted shop and an even brighter window. On the other hand, when a Londoner goes abroad into the small provincial towns he is indeed in darkest Africa. I spent a night recently in that charmingly romantic town of Berwick-on-Tweed. I counted 47 shops in the main street and at 9.30 p.m. only six had lighted windows whilst some even had their blinds down. There were scores of people drifting around with nothing to do who should have been fair game for the enterprising shopkeeper. Boots The Chemists were one of the few who lit their windows, which confirms that this firm takes lighting seriously. On the other hand, the Saxone shoe shop was unlighted and one is tempted to ask why Saxone light up in London but not in Berwick. A BLC lecture to the Berwick shopkeepers would certainly not come amiss. I was glad to see that one of the newcomers to "combined operations", Harris & Sheldon, supported the BLC campaign by staging an exhibition at the Building Centre. Commercial firms who are members of the BLC can do themselves a lot of good by aligning their own activities with those of the Council, and in this connection I am sorry to see that only Holophane are using the BLC campaign symbol. Perhaps the sustaining members of the IES will be more responsive to the new Golden Jubilee symbol.

Improvement in home lighting has lagged way behind



250 and 400-watt reflector type fluorescent mercury lamps in a glass grinding and polishing shop of Pilkington Bros. (Philips Electrical photo).

improvement in other fields of lighting, presumably because increased output and increased sales are more readily appreciated than better eyesight, less irritability, fewer family quarrels and a brighter outlook on life generally. We are often fatalists where such things are concerned; how many who suffer from poor eyesight really seek out the cause, how many keep accurate records of cross words or angry looks. Many when they feel tired and depressed put it down to over-work, late nights or bad weather, but few consider adverse seeing conditions as a major contributory factor. It was hard enough to persuade industrialists that better lighting meant more and better production, and it may be harder still to persuade the man in the street or, to be more precise, the man and woman in their home, that seeing conditions play a large part in determining the harmony or disharmony of the household. The situation calls for propaganda and simple instruction with the shoulder of every electrical contractor and retailer to the wheel. It is a very difficult task which we must face, but the potential market is large and I think a great effort by all concerned would be well worth while. We lighting engineers keep things too much to ourselves, publishing in our professional journals for the benefit only of fellow lighting engineers. Let us see more lighting engineers writing for the women's journals and the "handyman" journals, let us see more informative advertisements in the press and on TV.

The paper at the IES Summer Meeting by Stevens and Dykes Brown on hotel lighting illustrated the revolution that has come about in this field in the last 20 years. Many of us who occasionally spend a night away from home can well recall the days when that one lamp on the ceiling was all that was considered necessary in a hotel bedroom. Gradually a bedside lamp was added on the assumption that reading in bed was the normal habit of the commercial traveller and today a lamp over the wash basin is pretty general, so at least we now have sufficient lumens for our normal bedroom tasks. All too frequently, however, one can only use the



Merchant Adventurers' "Ellipse" fittings designed by Paul Boissevain. The installation shown is at Jews' College, Montague Street, London. (Architects: Yorke, Rosenberg and Mardall). (Merchant Adventurers photo).



Harris and Sheldon "Paragrid-Tile" ceiling at their exhibition at the Building Centre, London. (Harris and Sheldon (Electrical) photo).

bedside lamp for reading if one lies on the floor, and the lamp over the wash basin, whilst useful for brushing one's hair (if any), is of little use for shaving. Similarly, whilst most public rooms sprout enough wall brackets to provide 10 fc they also contribute enough glare to turn an incipient headache into a real hangover; cocktail bars with wall brackets might well provide their customers with eye shades as well as salted chips. Seriously, though, I suppose it is inevitable that the first step towards good lighting is the provision of adequate lumens; their proper distribution must come later, and one day I suppose will come sufficient appreciation of aesthetics to demand well designed and appropriate fixtures.

A reference to the cost of bringing schools up to the standard required by the new legislation reminds me of the paper presented to the American IES last year in which an architect, R. F. Hammel, and a lighting engineer, L. E. Johnson, agreed that a greater reliance on artificial light (they called it "manufactured" light) would result in simpler, cheaper and more useful school buildings. They presented data which sought to show that the high cost of using daylight in terms of cost of increased heating easily outweighed

the cost of the alternative of artificial light. They also agreed that the cost of the building and its maintenance, without daylighting, is lower and that artificial light is more controllable. It was alleged that today it is only the school which is judged by its daylighting technique and that in factories, offices, hospitals, churches and homes—everywhere else in fact—the windows have as their primary purpose the provision of a pleasing atmosphere. I have not read how such economic arguments would apply in this country and it would be interesting to hear a British architect on this horrid subject of windowless buildings.

Holophane have introduced a fluorescent operating theatre fitting for use primarily on ships where the robustness, large coverage and reduced heating are welcome, particularly if the vessel happens to be passing through the tropics. The fitting is somewhat similar to the one which the GEC have marketed for many years but the new Holophane one is substantially vapour-proof and has a smooth exterior which is easy to clean. It houses six 5-ft. 80-watt tubes which provide about 350 lm/ft² on the operating table, enough for all but fairly major operations. Three warm white and three daylight tubes seem to satisfy the anaesthetists. The tubes normally run on DC and the control gear is mounted outside the theatre.

Merchant Adventurers would seem to have brought out another winner in their "Ellipse" range. The ellipse is more elegant than the sphere and much better suited to the low ceiling. Mechanically the "Ellipse" fittings are typically simple but well designed; basic sizes range from 10 in. for the 60-watt to 22 in. for the 300-watt filament lamp. This firm has also been improving some of its older designs by using extruded aluminium to reduce weight; examples are their louvre type fluorescent fittings, which they are quite willing to tailor to suit the architecture, and their multilight chandelier with the brandy glasses.

I have been struck by the increasing popularity of Rotaflex fittings, which are now widely known not only within the lighting industry but to the man in the street through the numerous displays to be seen in the shops. Reasonably priced and available in many colours and colour combinations, including clear and pearl, these fittings are of interest for large as well as small jobs, especially where the lighting is to play a decorative as well as a lighting role. Rotaflex fittings are made of extruded plastic and were introduced to this country from Denmark about five years ago, since when the range has been well and truly overhauled from the design point of view by John and Sylvia Reid. An important feature of these fittings is that they are or can easily be made suitable for exterior as well as interior use and I understand that they played a prominent part in the Blackpool "illuminations" this year. Like the Chrysaline method, the Rotaflex method of construction lends itself, within limits, to the production of luminous features, such as luminous columns, and I think we shall be seeing a lot more Rotaflex about in the future. I note that GEC have just brought out an equivalent type of fitting, made in rigid PVC and designed by Beverley Pick, under the trade name "Gaylon".

Having been involved in much of the argument about the consequences of smaller bulbs for incandescent lamps, I was very glad to see that British Standard 52 : 1952, Bakelite Lampholders, is being revised. There are many who are convinced that BS 52 has allowed many millions of lamp-holders to be produced which were by no means adequate for the job; one writer to the electrical Press pointed out that the shortcomings of the specification have been realised for several years but that nothing has been done to prevent the market being flooded with hundreds of thousands of

inadequate holders. It is to be hoped that the revision will ensure a satisfactory performance even when holders are used with the smaller lamps that are now being produced, and the even smaller ones which are on the way. If satisfactory performance is not soon assured for normal holders we may have to face up to the problem of popularising holders of the heavy duty type such as are marketed by Nettle Accessories and others. In this connection I note that the new range of normal lampholders by Nettle have porcelain interiors.

Thinking of heavy duty equipment reminds me of the REAL non-corrodible ceiling fitting. An all-porcelain body incorporates a BC holder in one piece with solid terminals mounted in a recess at the top of the body which can be screwed straight on to a conduit box. The opal glass bowl screws onto the body producing an elegant looking fitting which would be as acceptable in the kitchen as in the factory. REAL have, I note, also paid attention this year to dust-proofness in what they call their "Cliptite" ceiling fittings.

Last year I mentioned the excellent new lighting catalogue which Atlas had brought out and wondered whether this would be kept up-to-date. I am happy to say that it has been kept up to date by the issue of a supplement in which are to be found, amongst other things, details of the "Popular Range" which has developed from the "Popular Pack", new "wafer" fluorescent fittings for flush mounting, one of which is triangular in shape, and Sylvalume Illuminated Ceilings which have the optional refinement of acoustic baffles. One significant point I notice is the use of extruded Diakon diffusers on some fluorescent fittings, this is a new technique which should result in an appreciable reduction in the price of such fittings. Whilst writing of catalogues I must mention that Falk, Stadelmann and Troughton & Young have both won, the latter for the second year running, an RIBA/Building Centre Certificate of Merit for catalogues of use to architects.

The lighting at the Wales Empire Pool at Cardiff has provided an example of effective lighting without compromise. It was realised that three separate lighting installations were required and no attempt was made to make one set of fittings do two jobs. (Many installations are spoilt by trying to make one fitting do several jobs.) A fairly low level of general lighting is provided over the whole area by means of conventional fittings which are either recessed into the ceiling or mounted above the large louvres which also admit daylight: the pool itself, when in use, has to be lit to a much higher level and about 50 lm/ft² can be provided by 94 1,500-watt floodlights mounted above specially designed sections of the louvres: the curved roof which would otherwise be rather dark is lighted by two rows of port-hole fittings, each housing a 150-watt lamp.

Most lighting firms seemed to have had a go at church lighting this year; GEC at Gloucester Cathedral, AEI at Salisbury Cathedral, Atlas at the new Central Synagogue in Great Portland Street and Troughton and Young at the City Temple, to name only four. I mention these in particular because by considering them together I see several very important aspects of the subject which could not be seen by considering any of the installations individually. First, what is right for one church may be entirely wrong for another; churches are buildings of character and must be lighted accordingly. At Gloucester Mr. Waldram has been at pains to conceal the lighting fittings and allow an unobstructed view of the magnificent architecture: in Great Portland Street the proportions of the building are elegant but being plain the interior needs the decoration provided by the beautiful "Dutch" style chandeliers, which were designed by Mr. L. W. A. Davis, Chief Designer of George Forrest &

Son: at the City Temple spaciousness would appear to have been the aim. There has been quite a lot of relighting of smaller churches during the year, not I am sure as the result of what I wrote last year but no doubt at the instigation of many others who feel as I do.

Salisbury was primarily a floodlighting installation, the lighting of the outside rather than the inside, to mark the 7th Centenary of the cathedral's consecration. It may well be as important to light the outside of a church as to light the inside; man like moth is attracted to light, else what would be the point of floodlighting the front of a cinema or public house. Except it be floodlit, the 404-ft. spire of Salisbury Cathedral might as well be 404 inches by night.

The very successful installation at Gloucester should perhaps be given special mention as it is by far the largest installation yet to be designed by Mr. Waldram's "Designed Appearance" method. As I have mentioned in previous years, this method does not just plan to get so many foot candles on the working plane, hoping for the best, it starts off with a required brightness pattern, which includes shadow patterns or modelling, and then proceeds by the very best engineering principles to devise a lighting installation which will provide it. The method has now been developed and tested to a point where it can be applied with confidence to buildings whilst they are still at the drawing board stage. The details of the lighting at Gloucester have already been given in these pages.

Fluorescent tube circuits really are getting like radio circuits now that increasing use is made of the transistor oscillator in situations where only a DC supply is available. The abundant light, the low brightness and the small heating effect of the fluorescent tube are more than welcome in aircraft, buses, trains and yachts, to mention but a few of the applications being studied. The GEC has developed, in conjunction with Vickers Armstrongs (Aircraft) Ltd., a

The new Courtney, Pope "Tracelite" ceiling system at the Worcester CWS: an open grid of aluminium rods with plain blocks or lighting fittings at the intersections. No upward light and black paint above give the impression of a suspended ceiling. (Courtney, Pope (Electrical) photo).



transistor oscillator inverter unit which will operate 3-ft. and 4-ft. tubes in the cabins of the Vickers Vanguard turbo-prop airliners now being built; the unit is designed to operate from a 22-28V DC supply and to run the tubes at considerably less than their normal wattage in order to avoid the glare which would otherwise arise as a result of the very low mounting. Apart from increased comfort for the passengers the use of transistor oscillator inverters is an economy, especially from the point of view of maintenance, and their small size and weight (1½ lb.) is no mean advantage in aircraft design. As an experiment, 2-ft. 20-watt tubes are being run at normal wattage from a 24V DC supply with transistor inverters in some 1st Class coaches on the "Caledonian" express, between London and Glasgow. It seems to me that the transistor oscillator is a much more satisfactory proposition than the old-fashioned vibrator with its limited life and cruel waveform. This is perhaps the place to refer to the new Revo fluorescent lamp ballasts with a polyester impregnant; they point the way to smaller, better and cheaper ballasts and, who knows, perhaps less watts loss?

I cannot finish this section without mentioning the Benjamin "Model Fifty" range, which is in effect a redesign of the old Benjamin range of fittings to reduce variety and improve performance, especially as regards weatherproofness, dustproofness and robustness. It is surely a tribute to the pioneers of this firm that the basic elements of design have withstood 50 years of competition. Here, I may perhaps be permitted to remark that it is only after one has been making a survey of lighting development (albeit of a random nature) for a number of years that one comes to realise that the new and novel things which are so easy to write about are all too frequently the things of little moment. In their chosen sphere of operation, Benjamin are as pre-eminent today as they were 50 years ago, and it was a tragedy that Guy Campbell died only a few days before Benjamin's Golden Jubilee. Like W. H. Williams, whose untimely death is also to be recorded, he was one of the founder members of the IES who, although making no pretensions towards the technical side of lighting, recognised the need for a flourishing society under whose wing practitioners of the new art could meet the users; not only did they recognise the need, they saw to it that the means were forthcoming. Such action is, of course, not unexpected in one whose ancestor was a godson of Lord Nelson. (Hence the Campbell family name, Horatio.)

Conclusion

As I write these last few paragraphs at the end of 1958 I seem to see the end of a decade in which have been applied so many of the ideas and inventions of the 1930's; mercury, sodium and fluorescent lamps, the new fangled devices of unattractive complexity and dubious economy, are now the normal means of providing the foot candles. Filament lamps, of course, still continue to increase in use but, really and truly, only for decorative purposes. We can also say that the theory of silhouette vision on our roads, evolved in the 30's, has been applied as a matter of course in the 50's. Similarly the standards of lighting evolved as the result of Westons work have become the accepted norm. Likewise Calvert's studies of airfield lighting are today used by everybody—even if they do not always acknowledge the original designer.

Turning and looking through 1959 to the future, it seems to me that the products of the 1930's are now passing their peak of usefulness. Conditions have changed out of all recognition and with the changes come new demands. Our lamp scientists are finding ways of obtaining good

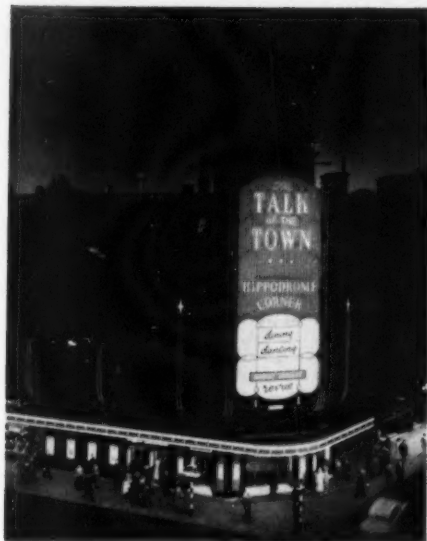
colour rendering with efficiencies higher than we got with raw discharge lamps 10 years ago and the scope for new materials in fittings design is clearly expanding year by year. The biggest change must surely be in lighting application engineering with the demise of the foot candle and the emergence of the foot lambert. (Whether we dress the former up as a lumen per square foot or not the fact remains that it is well on the way to obscurity—along with that outmoded word "illumination"). I sometimes think that those who coin our new words would have done a better service if they had left the foot-candle untouched and concentrated upon inventing a self-descriptive word for the unit of luminance; "foot lambert" sounds as though it ought to be self-explanatory, but it isn't. Indeed, in the years to come shall we thank our pedagogues for forcing us to mouth "luminance" every time our subconscious mind says "brightness"? But whether in the years to come we complicate or simplify our phraseology we are certainly in for an exciting time as, rustling and bustling we patter merrily after Pied Piper Blackwell to the joyous land "where sparrows are brighter than peacocks here."

Post Advanced Course in Illuminating Engineering

In co-operation with the Merseyside Electric Lighting Services Committee the City of Liverpool College of Technology has arranged a Post Advanced course in Illuminating Engineering beginning on Wednesday, January 14th, and extending over ten successive Wednesday evenings from 7 to 9 p.m. The subjects to be dealt with in the ten lectures and the lecturers are:—

| | | |
|---------|---|--------------------|
| Jan. 14 | Fundamental principles of lighting practice | A. Wilcock |
| Jan. 21 | Filament lamps | J. A. Moore |
| Jan. 28 | Discharge and fluorescent lamps | J. W. Strange |
| Feb. 4 | Lighting fittings and built-in systems | J. G. Holmes |
| Feb. 11 | Photometry | J. W. T. Walsh |
| Feb. 18 | Colour | H. Cotton |
| Feb. 25 | Installation design | H. E. Bellchambers |
| Mar. 4 | Industrial lighting | W. Robinson |
| Mar. 11 | Lighting of areas, streets and roads | J. M. Waldram |
| Mar. 18 | Commercial lighting | R. L. C. Tate |

The fee for the course is £1 10s. Enrolment for the course may be made at the college (Byrom Street, Liverpool, 3) or on the evening of the first lecture. Though this course may not be directly connected with the IES Golden Jubilee celebrations it is yet another lighting activity during the Jubilee year which already includes a public lecture by the President of the CIE, floodlighting of the cathedral and other places, a lighting exhibit at the Liverpool Show and a reception to the IES by the Lord Mayor and Corporation. The secretary of the MELS Committee which has sponsored the course at the College of Technology is Mr. A. Wilcock who is the BLC representative in the North-West.



The Talk of the Town

Theatre/restaurant at Hippodrome Corner

Project carried out under the direction of the Charles Forte Property Department, headed by B. McConnell. Architect A. T. Pine, L.R.I.B.A., M.Inst.R.A. Main contractors, Walter Lilley and Co. Ltd.; electrical installation and stage lighting, Strand Electric and Engineering Co. Ltd.; external lighting, Claude-General Neon Lights Ltd.; lighting fittings, G.E.C. Ltd., Lumitron Ltd., F. H. Pride Ltd.

THE Talk of the Town theatre-restaurant—a joint venture of *restaurateur* Charles Forte, impresario Bernard Delfont and producer Robert Nesbitt—has been created by extensive alterations to the London Hippodrome. The Hippodrome was opened in 1900 by Sir Edward Moss, the founder of Moss Empires. The first show starred Little Titch and included in its cast a small boy of 11 by the name of Charles Chaplin. Early productions included circuses and water-shows; pygmies performing a war-dance; and an “armless wonder” playing the violin.

In 1909 the theatre was partially rebuilt, the stage was enlarged and the arena was filled with seats. Houdini performed at the theatre; Marie Tempest played in a sketch with W. C. Fields; and Leoncavallo conducted his opera “I Pagliacci”—as part of a programme that included also the first American Ragtime Octette.

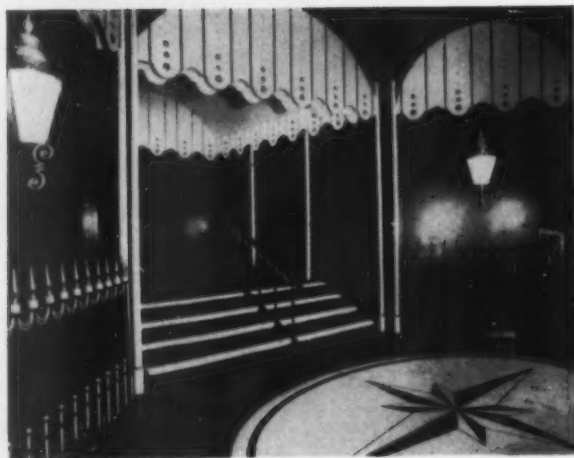
The London Hippodrome closed its doors to the public for the last time on August 17th, 1957, and to convert it to its present use an army of building workers and specialists worked over 160,000 man-hours in reconstructing the stage, installing rising and sliding orchestral rostrums, building a new revolving stage and making provision for an ice floor. All the existing flooring has been taken up and new floors installed in the stalls and circle, to provide the dining areas, have been covered with $1\frac{1}{2}$ miles of Wilton carpet.

There are three main kitchens—a vast preparation kitchen in the basement, where the refrigeration plant is housed; and two service kitchens, one at stalls level and one at circle level. There are over 40 cooks, 100 or more waiters, specially-trained “coffee men” and several pages. The building is air-conditioned—by plant giving 17,000 cu. ft. per minute of filtered and warmed air.

The Talk of the Town provides entertainment from 7.30 p.m. to 2.30 a.m., dinner, dancing to two bands and two stage presentations being offered at an inclusive



Inner foyer, with black walls, deep-purple carpet, and brass and crystal chandelier described in the text. Note the decorative use of illuminated signs at entrance to cocktail lounge.



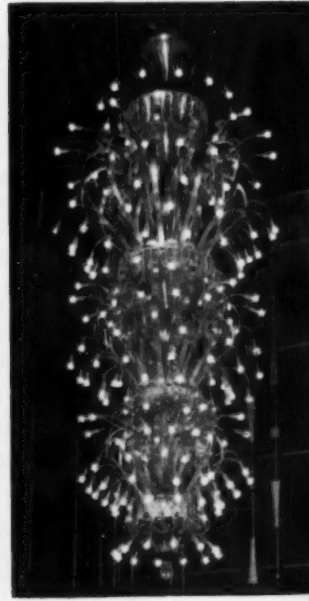
charge of 42s. 6d. a head.

The lighting installation may be dealt with under three headings: general and decorative lighting of the foyers and auditorium; stage lighting and external lighting. The foyers have been decorated with an eye to dramatic effect. Walls are black and the floor deep purple, while decorative elements, such as the cage for the parrots in the inner foyer, are picked out in white. General light comes from small semi-recessed spotlights in the ceiling which throw a minimum of light on to the walls. Decorative lighting is mostly in the form of genuine street lanterns which have been renovated, painted pale pink, decorated with gilt embellishments and mounted on short pedestals. Other lanterns were cut in half and used as wall lights. The glass in the lanterns was treated ceramically to give it a faint mauve hue to harmonise with the *décor*.

In the centre of the ceiling of the inner foyer is a white cupola, from which is suspended a special fitting of brass and crystal. The lighting is provided indirectly by 12 60-watt tungsten lamps housed by brass spinnings, each spinning being surrounded by a ring of crystal drops. The central feature, also hung with crystal drops, houses an internally-silvered spotlight shining downward through a louvred aperture.

In the auditorium the main lighting comes from a number of ceiling-mounted fittings hung with crystal drops, some 5 ft. 6 in., some 2 ft. 6 in. and some (around the periphery) 18 in. in diameter. These fittings each comprise an outer ring of tungsten lamps covered by a perforated brass rim which supports the central dished

Top left, ceiling-mounted fittings of brass and crystal in passage leading to auditorium. Note also shell-motif wall-lights. Left, entrance foyer, with wall-lights made from genuine street lanterns. Below, brass and crystal chandeliers in auditorium, each fitted with over 200 10-watt "Sputnik" lamps.





View of auditorium from circle level. The main lighting is from ceiling-mounted fittings with dished covers of diamond-patterned "Perspex."

cover of diamond-patterned "Perspex". Shining down through this cover are, in the case of the largest fittings, 12 100-watt lamps in silvered reflectors.

Flanking the stage are two 10-ft. high chandeliers which, during stage performances, are raised above the ceiling level. They are made of brass strip, in the form of scrolls, and brass tube, with some parts of copper to give added warmth. Each chandelier is fitted with about 230 special 10-watt lamps. Known as "Sputnik" lamps, each bulb has wound round it a filament of glass which, while hot, was "drawn off" to form a number of tendrils or "horns" which scintillate when the lamp is alight. Two smaller, but similar, chandeliers hang over the staircases.

On the tables in the circle are small table lamps with cylindrical shades of perforated metal and in the passages leading to the auditorium two other decorative fittings of special design are found. The first is a ceiling fitting of brass and crystal. Its central spinning houses a 60-watt lamp, which shines downwards through a louvred aperture and is surrounded by a ring of crystal drops. Radiating from this central spinning are 20 long brass arms and 10 short ones, each terminating in a "Sputnik" lamp. Between the two rings of lamps is a ring of crystal rosettes.

The other fitting is a wall-light consisting of a sculptured panel in the form of several oyster shells, each complete with a giant pearl. The panel stands proud of the wall, concealing a group of tungsten lamps. All brass-work of the fittings is lacquered to tone it to rich golden

colour, and all lighting in the auditorium is on dimmer circuits.

Stage lighting is remotely controlled from a 120-circuit switchboard-console of electro-mechanical design. It is situated in a control room from which the operator can observe both stage and dance floor. The dimmer "bank" is in the basement. Above the stage and restaurant ceiling are over 100 soft-edge "Fresnel" spot-lanterns of a new design, said to be in use in the U.K. for the first time.

The exterior cladding is of toughened black glass, with aluminium-framed poster cases at intervals along the frontage, lit by fluorescent lamps. The lighting has made Hippodrome Corner one of the brightest spots in the West End. The dominant feature is a 47-ft. high by 17-ft. wide panel forming a background to star-studded letters, the tallest of which are 4 ft. high. Lit by white tubing, the letters project from the main panel, which comprises a vertical grid of red tubing operating on a 10-second flashing sequence—from the centre outwards and back to the centre.

Below the main panel is a single-sided box sign, 17 ft. square, with an opal panel carrying coloured "Perspex" lettering and decorative stars. The complete corner display is outlined by triple rows of jasmine tubing, and on either side further double lines of jasmine tubing reach up toward the top of the tower and are surmounted by an opal "Perspex"-faced star, internally illuminated.

Double vertical lines of tubing are placed at intervals along the Cranbourn Street façade, at the end of which a narrow vertical panel stretches skywards, with lettering similar to that of the main sign. The canopy has a valance with diamond-studded stars lit by a line of white tubing and a soffit with three metal troughs housing lines of white and amber tubing.

Lighting Abstracts

OPTICS AND PHOTOMETRY

- 535.241
629. Measurements made with the Ulbricht (integrating) sphere.

K. STOLZENBERG, *Lichttechnik*, **10**, 518-520 (Oct., 1958). In German.

The author has examined experimentally several of the sources of error in making measurements with an integrating sphere. He used a sphere of 1.5 metres diameter and an internally, reflecting shop-window lamp with a breadth of beam, to half value, of 15° . This was placed at the centre of the sphere and given a number of different orientations. The first effect studied was that of departures from cosine proportionality in the photocell used. Then the effect of size of the screen was investigated and finally the contribution of different zones of the sphere to the total illumination of the sphere window was measured. From his results the author deduces a curve showing the error made in measuring tubular fluorescent lamps of different lengths relative to the diameter of the sphere.

J. W. T. W.

628.972

- 630. Present position as regards assessment of glare in interiors.**

D. FISCHER, *Lichttechnik*, **10**, 465-468 (Sept., 1958). In German.

The author reviews past work on glare, particularly that of Luckiesh and Guth, Petherbridge and Hopkinson, and Vermeulen and de Boer, and explains the derivation of the glare index and its significance. The different methods of allowing for the position of the source in the field of view are mentioned. For the term "visual comfort index," used in America to denote the percentage number of observers who find a particular condition just comfortable, he proposes the German term "index für Blendungsfreiheit." The practical application of the work depends on the availability of a simplified procedure, e.g., one employing tables analogous to those giving utilisation factors.

J. W. T. W.

535.241

- 631. Minimum distance for the photometry of the real image of a light source.**

H. J. HENTSCHEL and O. REEB, *Lichttechnik*, **10**, 370-372 (July, 1958). In German.

In the photometry of sources such as arcs, measurements have frequently to be made on a portion of the source and it is then common practice to form a real image of the source by means of an optical system and to make the measurements on this. The authors examine the relation between the luminous intensity of any part of such an image and that of the corresponding part of the source. They then go on to consider the minimum distance from the image at which the measurements can be made if a certain accuracy is to be attained, taking account of the dimensions of the measuring device

J. W. T. W.

LAMPS AND FITTINGS

- 632. Fluorescent ballast protection.** 621.327.43

G. E. PIPER, *Illum. Engng.*, **53**, 513-515 (Sept., 1958).

American fluorescent lamp ballasts with Class A insulation have a limiting operating temperature of 105°C . Faults such as lamp or ballast failure, lamp rectification, installation error or poor heat dissipation can cause an excessive temperature rise (to 200°C . or more), resulting in rapid

deterioration of the winding insulation and dripping of molten pitch. A ballast protector has now been devised which is built into the ballast and connected in series with the primary winding. This disconnects the ballast from the circuit when the temperature exceeds 125°C . and reconnects it when the temperature falls to 85°C , so preserving the ballast's rated life.

P. P.

621.327.534.15

- 633. Fluorescent lamps with a non-circular cross-section.**

K. BERNHARDT, *Lichttechnik*, **10**, 416-417 (Aug., 1958). In German.

The principles governing the relation between the physical dimensions of a fluorescent lamp and its efficiency are explained. It has been found that for the forms of cross-section of tube investigated, the maximum efficiency increases as the ratio $p^2/a^{0.75}$ where p is the perimeter and a the area. In the American "power-groove" lamp, with a cross-section like a wide inverted U, this ratio is high and it is therefore possible to increase the loading without reducing the efficiency. The paper includes a table of the characteristics of the 100, 150 and 200-watt lamps and polar curves of light distribution in planes containing the axis and at right angles to it.

J. W. T. W.

- 634. Electrical discharges in mixtures of gases.** 537.527

P. SCHULZ and H. STRUB, *Lichttechnik*, **10**, 364-369 (July, 1958). In German.

The authors have studied the characteristics, including the luminous intensity per cm. of the discharge through argon, krypton or xenon at high pressures (30 to 50 atm.) when these gases are mixed with much smaller quantities of helium, hydrogen or mercury at partial pressures of 0 to 3 atm.

J. W. T. W.

LIGHTING

- 635. Lighting for football and other ball games.** 628.971

G. HASSEL, *Ljuskultur*, **30**, 35-43 (April-June, 1958). In Swedish.

The principles of lighting large arenas for football and ice-hockey are discussed, and examples of good current practice in different countries are given, together with estimates of costs. A detailed comparison between the installation at Old Trafford and that at Rasunda in Sweden is given. The second part of the paper deals with indoor sports halls for tennis, badminton, etc. Outdoor tennis should be treated as for indoor tennis, but naturally the installation must be more generous.

R. G. H.

- 636. Lighting in our schools.** 628.972

C. B. HOLMBERG, *Ljuskultur*, **30**, 45-50 (April-June, 1958). In Swedish.

Fluorescent lighting has been advocated for schools for some time in Sweden, but it has not been without its critics. A detailed social survey made by Dr. Urban Hjärne in 1955 showed, however, that there was a general satisfaction on the part of teaching staff with good fluorescent lighting, although many improvements, especially in colour, were sought. New schools are now generally well lit, but old schools still leave much room for improvement, and special attention is drawn to the need for fully adequate lighting in rooms which have to be used both for classwork and skilled handicrafts.

R. G. H.

637. Lighting : The windowless factory. 628.692

Arch. J., 128, 85-89 (July 17th, 1958).

For certain types of production, single-storey windowless factories such as have recently been built at Slough and Swindon have advantages where complex overhead services are essential or a high standard of cleanliness is required. Levels of illumination in windowless factories should, however, be about three times as high as the IES Code levels to produce conditions comparable with those in corresponding naturally-lit factories. At least 50 lm/ft² should be provided, with progressive adaptation to the interior level by controlled lighting of the entrance circulation. The interior level should in any case be higher than that recommended by the Code to give the employees an obvious compensation for the absence of daylight. The colour rendering of the lighting in a windowless factory is particularly critical, and where view windows are provided their brightness should be limited with neutral-tinted glass.

P. P.

638. Staircase in a department store. 628.9A. RUDBERGER, *Byggmästaren*, 36, 226-7 (No. A10, 1957). In Swedish.

A novel feature is the space between roof and walls through which daylight and artificial light can penetrate to light the stairway.

R. G. H.

639. Art gallery at Lund. 628.9K. ANSHELM, *Byggmästaren*, 37, 18-23 (No. A1, 1958). In Swedish.

Daylighting is admitted to the gallery through steep lantern windows orientated northwards, glazed with semi-diffusing glass. Projector lamp fittings are mounted outside these lanterns, and light thus projected through the windows into the room. Other rooms are lit artificially with adjustable filament lamps.

R. G. H.

640. Variable light-distribution from fluorescent street lighting fittings. 628.971.6G. DOVERSTAM and C. F. ROEMPKE, *Ljuskultur*, 30, 59-60 (April-June, 1958). In Swedish.

A street lighting fitting has been designed in which the position of each of the three 40-watt tubes can be altered to give a variable cut-off.

R. G. H.

641. Experimental lighting on the Norrtälje Road. 628.971.6*Ljuskultur*, 30, 51 (April-June, 1958). In Swedish.

A new double-carriageway arterial road out of Stockholm is being lit experimentally to compare the cost and efficiency of a centrally mounted sodium installation and a side-mounted fluorescent tube installation. The central-mounted installation is only half as costly, but the side-mounted system gives better visibility.

R. G. H.

642. New design approaches to residential lighting. 628.972E. W. COMMERY, *Illum. Engng.*, 53, 291-299 (June, 1958).

Domestic lighting is first considered in terms of the total number of generated lumens. For dwellings illuminated in accordance with the Residence Lighting Practice of the American IES, the minimum number of generated lumens per square foot of floor area is found to be 70. The various basic luminaire forms which can be used to control and distribute these lumens from either tungsten or fluorescent

sources are next considered. Finally, the realisation of the lighting design technique in typical contemporary rooms and in an actual house is described.

P. P.

643. Luminous ceilings with incandescent lamps. 628.972D. E. SPENCER, *Illum. Engng.*, 53, 300-306 (June, 1958).

Luminous ceilings in dwellings become a practical proposition provided incandescent lamps are used to offset the otherwise high installation cost. The lower luminous efficiency can be partially compensated for by using low voltage lamps wired in series-parallel, while the resultant colour rendering is probably more acceptable for domestic purposes than that given by fluorescent lamps. Descriptions and technical details are given of luminous ceilings installed in traditional and modern houses. Dimming can be effected by switching from a tapped auto-transformer, the resultant effect varying from the quality of soft firelight to that of sunlight.

P. P.

644. Studies on daylight availability. 628.92R. A. BOYD, *Illum. Engng.*, 53, 321-330 (June, 1958).

Continuous recordings have been made for a period of a year (1953-1954) at Ann Arbor, Michigan, of the daylight illumination on a horizontal plane and on vertical planes orientated north, south, east and west. The measurements have been analysed in terms of two lengths of working day and have been correlated with degree of cloudiness and with ratio of max/min vertical surface illumination. Empirical formulae have been derived whereby average horizontal and vertical illuminations can be derived from the corresponding illuminations for cloudless days. It is demonstrated that 2000 and 1000 lm/ft² are reasonable averages for the horizontal and vertical illuminations respectively at the measuring location during the arbitrary working days.

P. P.

645. Lighting for hotels. 628.972*Illum. Engng.*, 53, 359-399 (July, 1958).

Compiled jointly by the Hotel Lighting Sub-committee of the American IES and the American Hotel Association, this copiously illustrated report deals with every aspect of hotel lighting. Recommended illumination levels for different hotel activities are listed and the characteristics of incandescent and fluorescent lamps to achieve these levels are described. The lighting of each part of an hotel is then separately dealt with, particular attention being given to desk, bed and dressing table lighting.

P. P.

646. Street surface brightness and freedom from glare as practical criteria of excellence in outdoor lighting. 628.971.6J. B. DE BOER, *Lichttechnik*, 10, 359-363 (July, 1958). In German.

The principal factors which determine the excellence of a street lighting system are its revealing power and its freedom from discomfort glare. For good revealing power a high and uniform road surface brightness, of the order of 0.6 ft-L is needed and this corresponds to an average illumination of about 2 lm/ft². It is possible to design fittings which will provide this without excessive glare and by the use of isocandela diagrams it is possible to arrive at a figure of merit which combines road surface brightness and glare for any installation of known spacing and mounting height. To illustrate the method a comparison is made between installations of colour-corrected mercury lamps and similar installations using sodium lamps.

J. W. T. W.

A Large Area Luminaire with Xenon Lamps of High Loading

By WALTER SCHMIDT
and ROLF LEHMANN.

A description of an experimental unit erected in Munich as a contribution to that town's 800th anniversary and which might be a pre-view of the street lighting of the future.

THE idea of lighting the streets of a town from a few very high pylons, so as to avoid a forest of poles, is by no means new. It came to nothing, however, not only because of the lack of light sources with a very high output, but even more because most streets would be completely shaded by buildings and therefore would remain in darkness. If, then, streets of ordinary width are to be lighted with fittings at a specified mounting height, the spacing must not exceed certain accepted limits, or the illumination will not be sufficiently uniform. Although it is possible, by mounting at a considerable height, to use greater spacings, especially with asymmetric fittings, the lighting efficiency measured at the working plane is then often greatly reduced so that the economics of the installation are adversely affected. These considerations do not apply to large areas or especially wide streets.

In such cases it is not impossible to exceed the mounting heights generally employed hitherto without reducing the lighting efficiency. Thus, for example, an open space of 270 feet in diameter can be illuminated by one fitting at a height of 100 feet, or by 7 fittings at a mounting height of 37½ feet, with about the same efficiency, assuming the light distribution is the same in both cases. The larger fitting must emit the same light flux as the 7 smaller fittings. The flux given by a large number of small lamps is lower than that from a smaller number of large lamps of the same kind, so that the use of a large fitting may result in a saving of energy. In our towns today there are a number of areas, with traffic circulating on a roundabout, where the installation of a large number of fittings presents difficulties. In such cases there are undeniable advantages in the use of a single fitting or a reduced number of fittings of high light output at appropriate mounting heights.

We all know that for the safe and rapid movement of high density traffic, the values of illumination customary today are by no means sufficient. This situation will be further aggravated in a few years' time, for we must always reckon on a marked increase in the traffic. Consequently provision must be made for taking a notable step forward in street lighting. There are already numerous instances where this has been done; abroad, for example, especially in countries with a high traffic density, illumination values of between 5 and 10 lm/ft² are to be found. For such installations lamps with high light output are needed.

A short time ago researches on the electric discharge

through xenon made possible the production of lamps of very high light output.* Lamps with a long arc, with loadings of 20 to 65 kW, were produced. What could be more appropriate than to use these for the street lighting of a wide space and in this way to demonstrate the possibility of the rational use of a single luminaire for a large area? The possibility of attaining, at the same time, a high level of illumination should point the way to a future development. The remarkably white colour of the light, with a close approximation to the spectrum of daylight, has already opened up wide possibilities of application in other fields.

These considerations led the Osram and the Siemens Companies in Germany to decide that they would pioneer an attempt to build a luminaire with very high light output. The 800th anniversary of the town of Munich provided an opportunity for installing such a luminaire at a

* A. Lompe. "A new type of xenon lamp," *Lichttechnik*, 10, No. 3, March 1958, p. 108. (*Light and Lighting*, Abs. 581, July, 1958).

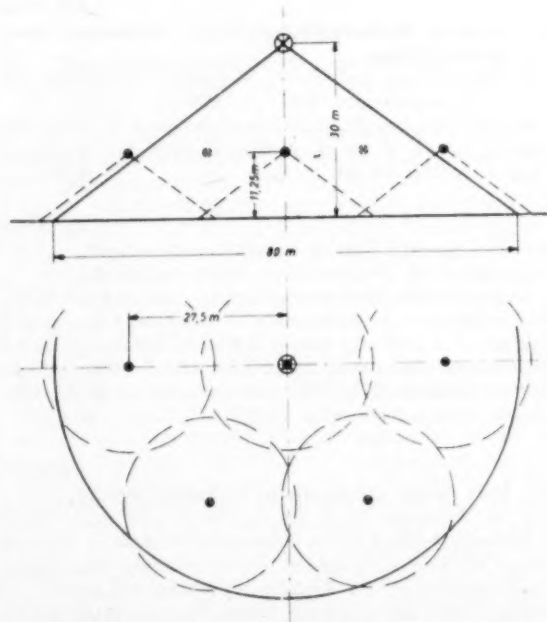


Fig. 1. Diagrammatic comparison of the illumination of a plane by a large number of low-power luminaires at low mounting and by a high-power luminaire at high mounting.

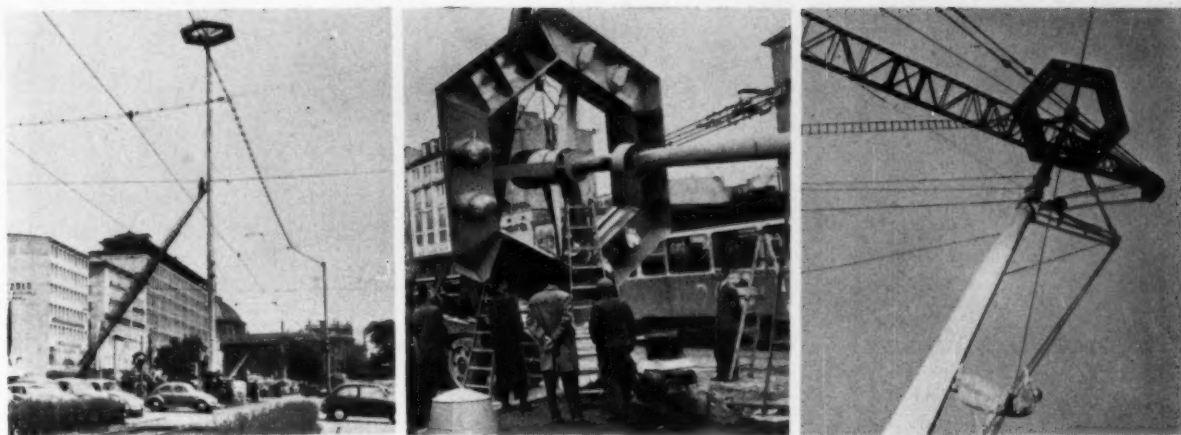


Fig. 2 (left). General view shortly before completion of the work of erection. Fig. 3 (centre). General view of the luminaire. Fig. 4 (right). Erection of the pole and luminaire.

height of 100 ft. in the most heavily trafficked area with roundabout circulation in the Sonnenstrasse (Fig. 1). For this purpose three high-loading xenon lamps of 20 kW each were connected, with their chokes, between phases of the a.c. network (380 V). Delta connection in this way gave a balanced load on the network. The high-loading xenon lamp is similar in shape to the long tubular fluorescent lamp. The particulars of the 20 kW lamp are as follows:—

| | |
|---|------------------------|
| Loading | 20 kW |
| Current | 75 amps. |
| Operating voltage | 270 volts |
| Luminous flux | 550,000 lumens |
| Total length | 70 inches |
| Diameter | 1.2 ins. (quartz tube) |
| Gas pressure approximately one atmosphere | |

The lamp is started by means of an impulse provided by a starter. The lamps start immediately, no matter what the temperature of the surroundings, and give their full

light output almost at once.

The specially designed post-top fitting was made hexagonal, both for technical reasons and for the sake of appearance, and has a diameter of some 16 feet (Fig. 3). The total weight is about 1.2 tons. Three sides take the xenon lamps in concentrating reflectors with parabolic trough mirrors of aluminium. The other three sides carry the starters. In order to prevent these sides from appearing dark, six oval reflector fittings, each with a 400-watt colour-corrected mercury lamp, are mounted on them with the necessary chokes. When the xenon lamps are in operation these mercury lamps provide 6 to 8 per cent of the light. When the traffic is much lighter, after midnight, the xenon lamps are extinguished by a time switch, while the mercury lamps burn all night. In full operation the total light flux emitted by all the lamps together is about 1.7 million lumens.

During the development of this luminaire a number of technical problems had to be solved. To enable the best

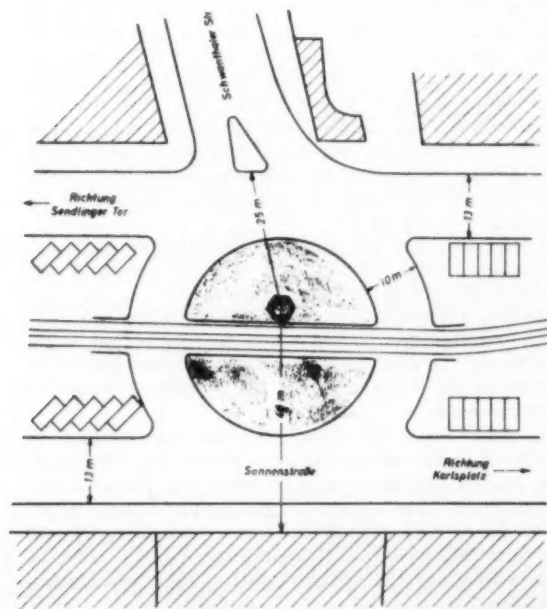
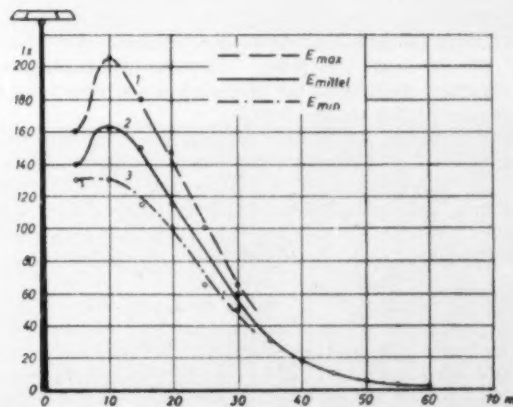


Fig. 5 (left). Position of the luminaire in the Sonnenstrasse.

Fig. 6 (below). Relation between value of illumination and distance from the pole.



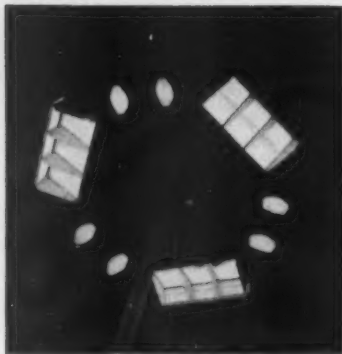


Fig. 7 (above). Luminaire in operation.



Fig. 8 (right). Effect on the street at night.

use to be made of the light output, glare effects had to be carefully avoided. The high starting voltage needed for the xenon lamps, of the order of 50 to 70 kV, made it necessary to bring the starters as close as possible to the lamp terminals. Although special cooling of the lamps themselves is not necessary, good ventilation of the fitting had to be provided in order to prevent excessive temperature rise in the components. For this purpose a blower is mounted at the top of the pole and this drives cold air through the three supports into those parts of the fitting which carry the mercury high-pressure lamps. The air then passes over the starters into the xenon fittings and escapes through suitable honeycombed outlets. This air circulation, with several changes per minute, ensures—as running tests over periods of many hours have shown—that the built-in auxiliaries remain almost cold, while the cables and metal parts do not reach any undesirably high temperature. A relay operated by an air vane makes it impossible to run the lamps when the blower is not working.

The supply cables to the fitting terminate in a control box 100 ft. from the pole. This box holds not only the necessary switchgear but also chokes and compensating condensers for the xenon lamps.

The luminaire is mounted on a one-piece reinforced spun concrete pole, made by Moll, by means of three screw bolts 120° apart. The pole has a total length of 106 ft., with 6 ft. in the ground; the diameter at the base is 27½-ins. and at the top 8-ins.. The method of construction ensures a high rigidity in spite of the extremely slender form. The total weight of the pole is 9.6 tons.

As the pole had to be erected in a very short time (2½ hours), while the night service of the tramway was interrupted, the completely equipped fitting was mounted during the day onto the pole as it lay on the ground. By means of a crane and a system of guy-ropes it was first lifted

and then dropped into the ground (Fig. 4).

Thanks to the perfect co-operation of the municipal authorities and the firms involved, the installation, in spite of the short time available for its construction and assembly, was put into service at the beginning of the 800th anniversary celebrations, to the delight of the townfolk of Munich and visitors.

Fig. 5 shows the position of the pole in the area. The uniformity of the illumination over the roundabout is very good even though the pole could not be placed exactly in the middle because of the tram track. On the roundabout the average illumination is about 10 lm/ft². The relation between illumination and the distance from the foot of the pole is shown in Fig. 6. Curve 2 shows the mean illumination, measured along different radii around the fitting. The measured minimum and maximum illuminations at different distances from the foot of the pole—curves 1 and 3—show the satisfactory uniformity of illumination obtained at all positions on any one circle.

In order to avoid any possible complaints on the score of glare, four black screens were mounted perpendicular to the axis of each xenon lamp (Figs. 3 and 7). As trials have shown, it would be possible to dispense with the screens without causing objectionable glare, because of the height of the fitting. In that case the average illumination would be increased by 15 per cent and the uniformity would be further improved.

The high values of illumination on the carriageway ensure good traffic safety and show clearly that the illumination usually provided today in areas with heavy traffic is not sufficient. The use of a single fitting at a great height with lamps of very high flux output for lighting up the whole area facilitates traffic supervision (Fig. 8). The installation described is a demonstration of the traffic lighting of the future.

INSTALLATIONS

Electricity board showroom

Distinctive lighting, designed by the General Electric Company Ltd. in close co-operation with the architects, plays an important part in the impressive new-style decor of the East Midlands Electricity Board's new service centre and offices in Carrington Street, Nottingham.

Over a quarter of a mile of fluorescent tubing has been used in the installation which is a modern application of low brightness and high intensity light sources, providing plenty of light without glare.

The combination of warm white fluorescent tubes for low brightness and tungsten lamps for high intensity produces an effective three-dimensional effect for the display of electrical goods on show in the windows and at the same time enhances their true colours.

Attractive lighting effects on the ground and mezzanine sales floors are provided by the decorative Rotterdam grid-type ceiling, which allows complete flexibility in lighting layout.

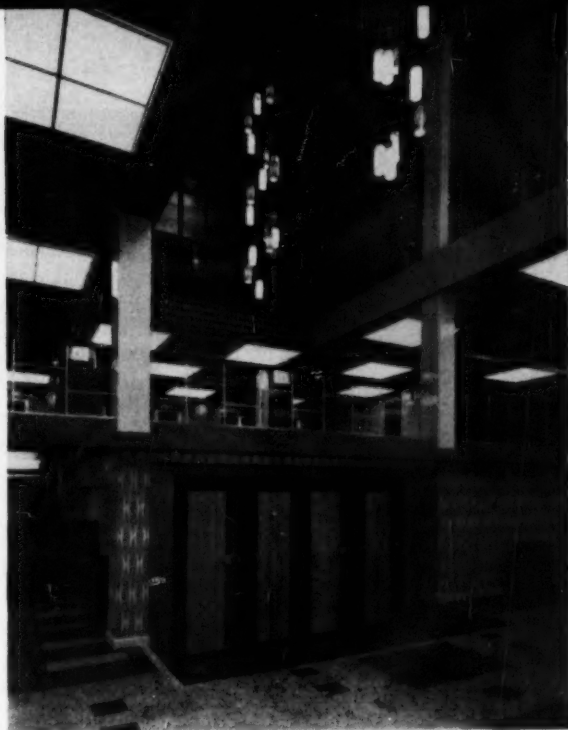
Two specially designed 10 ft.-long fittings suspended in a light well between two floors provide an impressive eye-catching feature. Each carries 16 lights with brightly coloured cylindrical shades arranged to form an ascending spiral. On the faces of the main columns of the mezzanine floor the white opal "Perspex" wall brackets carry the EMEB's coat of arms which shows up as a silhouette when the fitting is illuminated.

Board and coating mill

Papyrus Ltd. manufacture coated folding boxboard at Newton Kyme, Tadcaster. The plant consists essentially of an M.G. Board machine, producing board 104 ins. wide at approximately one ton per hour, together with ancillary preparatory plant for treatment of the wood pulp, the principal raw material.

The board machine is approximately 100 yards long and owing to its height, depth and operation, presented some difficulty in getting a reasonable penetration of light in depth without glare. This problem was overcome by installing the lighting fittings vertically on the main piers of the building and using an opal plastic diffusing cover. There are 37 such fittings—each equipped with two 5 ft. 80-watt warm white tubes—installed at intervals of approximately 15 ft. along the length of the bay, the lower end of the fitting being 5 ft. 6 ins. from the floor. The lighting is well diffused and besides giving a fairly even light inside the machine house, affords sufficient lighting for general inspection of the board. At certain points additional spot-lights and fluorescent fittings have been fitted for closer examination of the board as it passes through the machine. The lighting fittings were designed by Crompton Parkinson Ltd.

One of several cold stores of Eskimo Foods Ltd. at Hull where the temperature goes down to minus 20° F. Lighting is provided by Crompton vapour-proof fluorescent fittings in which each lamp is enclosed in a "Perspex" cylinder as protection against breakage of the lamp and subsequent spoiling of the food stored.



Electricity showroom in Nottingham



The Papyrus board mills



NEW PRODUCTS

Decorative plastic tungsten lamp fittings

An inexpensive new range of lighting fittings, designed specially for the home by Beverley Pick Associates, is now being marketed by the GEC Ltd. Named the Gaylon range, it comprises elliptical shaped enclosed fittings moulded from rigid (p.v.c.) plastics and includes two sizes of pendant fitting and a table standard. The pendant fittings are of 11 in. diameter to house a 60-watt lamp, and 16½ in. diameter to house a 100-watt lamp. The table standard consists of a simple, black wire frame to which the 11 in. diameter fitting is attached and is supplied complete with flex, a torpedo switch and a lifting handle which extends through the top of the shade. There is a choice of three colour combinations. Top bowls are obtainable in red, yellow or white and the lower bowls for each colour comprise white diffusers. The white diffuser is secured to the coloured top bowl by an external detachable polished brass ring. Costs were £1 9s. 0d. for the 11 in. and £1 19s. 11d. for the 16½ in. pendant fitting; the table standard costs £3.

Coloured porcelain fittings

"Lidner" contemporary porcelain and glass lighting fittings (made by Loblite Ltd. of Gateshead) are now available in a variety of pastel colours in addition to the traditional white finish, to meet the demand for colour harmony in contemporary buildings and in the home. They are particularly resistant to adverse atmosphere conditions. For kitchen and bathroom, fittings can be chosen to blend with tiles or general colour schemes. Fittings in neutral grey are suitable for outdoor use as they harmonise with most external decorating schemes.

Capacitors

TMC announce that they are now able to offer a new range of aroclor impregnated paper capacitors.

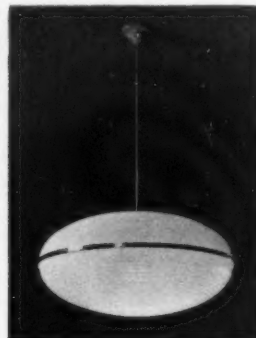
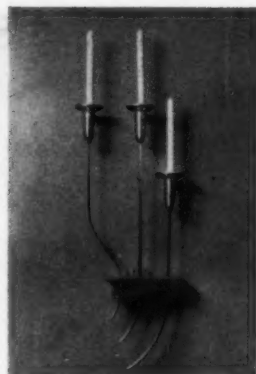
This range is being introduced to supplement the existing TMC range of lamp capacitors and have been designed primarily to meet higher temperature working conditions as well as to withstand the rigorous electrical and mechanical conditions of service and to give a lasting performance. A Technical Bulletin is available from Telephone Manufacturers Company Ltd., Cray Works, Sevenoaks Way, Orpington, Kent, with details of the standard range. For special requirements the capacitors can be supplied with a variety of alternatives or additional features.

Fluorescent lamp chokes

Cayson Electrics Ltd. announce the introduction of a new range of fluorescent lamp chokes having a rock hard silica filling. Advantages claimed are (1) exceptionally low temperature rise due to the excellent heat conductivity of the new filling, (2) silent operation, (3) filling is thermostetting and cannot be made to run or drip under any conditions, (4) safely withstand continuous connection in faulty circuit for months on end. The new range includes "Slimline" and "Slim-Brick" types in all ratings. The price is the same as other types made by Caysons.

H. W. Field and Son Ltd. also announce the use of a new filling material, "Resincast" for fluorescent lamp chokes. This material is said to have excellent thermal properties

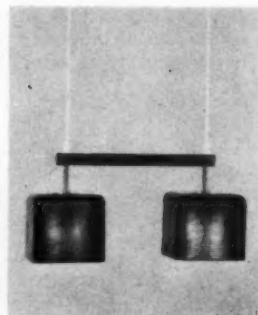
A three-light candle lamp bracket made by Troughton & Young (Lighting) Ltd. and used in the new Candlelight Room at the May Fair Hotel, London.

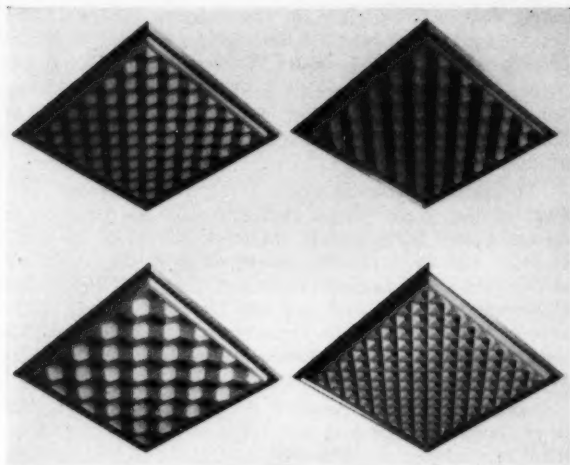


Two fittings of the GEC "Gaylon" range.



Three of the range of Orrefors glass fittings now available in this country from J. Wuidhart & Co. These fittings are made in a combination of a grey-green glass and crystal or a light grey and crystal on grey-green.





Luminated pyramid panels.

and the choke therefore operates at lower temperatures; at high operating temperatures "Resincast" tends to harden rather than to soften. This new filling is being used in all 80-watt chokes made by the company.

Luminous ceiling panels

A development of the Luminated Module ceiling is announced by Luminated Ceilings Ltd. The new system, called the Luminated Pyramid, utilises the basic components of the Module ceiling but offers four new designs of translucent modules, each of which provides a separate effect. The three-dimensional designs are based on a repeating pyramidal pattern and they can be used either separately or in combination with each other, or with the standard plain or patterned Luminated Module panels, to give a wide variety of attractive layouts. To economise on lighting, and to increase the decorative effect, panels of acoustic board or tiles, etc. can be incorporated in the false ceiling, and surrounds of similar materials can also be used. Each module is vacuum-formed from vinyl plastics sheet, .015-inch thick, the pattern itself providing the necessary rigidity. The panels will not support combustion and are generally acceptable for use in all public places. To retard dust, the panels are subjected to an anti-static process but they can be lifted out by hand when necessary for cleaning with a soft brush. The cost is approximately 10s. per sq. ft. excluding lamps.

Technical collaboration/tie-up on manufacture of Photoflash lamps required. Interested parties please write to

**Inter-Continental Exports & Imports,
522 Diagonal Road,
Visvesvarapuram,
Bangalore-4, (S. INDIA)**

Obituary

Readers of *Light and Lighting* whose interests are primarily in the field of daylighting will be sorry to read of the death on August 2nd, 1958, of Professor Wilhelm Büning. Professor Büning was an architect on the professional staff of the Institute of Technology in Berlin. He had long been active in the study of daylighting and town planning, and had made many valuable personal contributions, the most recent being his leading part in the preparation of the German Standard DIN 5034 on the daylighting of interiors. Professor Büning will be remembered with affection by those who attended the CIE Daylight session in Paris in 1953, although it was clear then, and on his subsequent visit to England in 1955, that he was a sick man. The study of daylight has lost a valued worker, and his colleagues in all countries will miss one whose kindly personality broke down all international barriers.

Situations

Wanted

EXECUTIVE SALES ENGINEER, Dip.M.I.E.S., late thirties, 16 years' experience in sales at home and abroad, seeks senior sales post with progressive firm of lighting equipment manufacturers.—Please reply to Box No. 594.

LIGHTING ENGINEER, Dip. M.I.E.S., age 37 years with considerable electrical and administrative experience in London and Home Counties, seeks an executive appointment in a managerial capacity. At present responsible for a large provincial area. Car owner. Salary envisaged approximately £1,200 per annum.—Box No. 595.

Vacant

Atlas Lighting Limited require TECHNICIANS for interesting work in Lamp Development Laboratory situated in North London. Previous experience an advantage.—Apply in writing to WJM/LED, Atlas Lighting Limited, Angel Factory Colony, Angel Road, N.18, stating qualifications and previous experience.

Ekco-Ensign Ltd. require experienced LIGHTING ENGINEERS at their Birmingham and London offices. They should have completed National Service and be conversant with modern lighting planning and equipment.—Apply Senior Lighting Engineer, 45, Essex Street, Strand, W.C.2.

Electrical Manufacturing Company in London require a qualified LIGHTING ENGINEER experienced in internal, industrial and commercial lighting schemes. Age up to 45. — Apply, giving full details, to Sales Manager, Lamp and Lighting Division, Siemens Edison Swan Limited, 38-39 Upper Thames Street, London, E.C.4.

Electrical Manufacturing Company in London require a SPECIALIST SALES ENGINEER to deal with special light sources such as high pressure discharge lamps, U.V. lamps, etc. A Sales Engineer with considerable technical experience in this field is preferred but applicants with general experience in the lamp industry would be considered and suitable training given to the successful applicant in the Company's Research Laboratory. This is a progressive appointment carrying a commensurate salary. — Full particulars to Box No. 596.

Experienced LIGHTING ENGINEER required, age about 25 years, must have completed National Service. — Apply in writing, giving full particulars and qualifications, to: Manager, Lighting Department, The General Electric Company Limited, Newhall Street, Birmingham.

Book Review

Technisch-wissenschaftliche Abhandlungen der Osram-Gesellschaft (Technical and scientific papers of the Osram Company), Vol. VII. Pp. 408 + viii, with numerous figures; name and subject indexes. Published by Springer-Verlag, Berlin, Göttingen and Heidelberg, 1958. Price DM42.50 (72s. 6d.).

This volume contains 63 papers by members of the research staff of the German Osram Company, all written during the last two or three years. In previous volumes the majority of the papers included were reprints or summaries of papers published in technical or scientific journals, but in the present volume only twenty have been published previously; all the remainder now appear for the first time. As pointed out in the preface, a comparison of the papers in this seventh volume with those in the first volume provides an interesting picture of the ways in which light sources have altered character over the last 30 years.

Not unnaturally, many of the papers treat of matters which interest primarily those engaged in the study of lamps and the materials used in their manufacture, but some are wider in scope. For instance there is one paper on a cosine-corrected photometer and another on a method of expressing the colour-rendering qualities of a source. The final two papers deal with statistics and quality control.

The production of the volume is well up to the high standard always associated with the publishing house of Springer and the whole book is impressive evidence of the volume of scientific work being undertaken in Germany at the present time on problems of all kinds connected with lamps.

J. W. T. W.

Personal

MR. WALTER A. IVES, who has been with AEI member-companies since 1925, has left AEI for Southern Rhodesia to join consulting engineers Chas. D. Burnell in association with Viljoen and Keyter in Salisbury. From Northampton Polytechnic Mr. Ives graduated via the illuminating engineering departments of Siemens (1925-1930) and Ediswan (1930-1935) to responsibility for the lighting planning for Harcourts Ltd. (1935-1940). In 1940 he joined the Ministry of Supply dealing with lighting in war production factories and in 1942 he was seconded to the Government of India, as Essential Services Officer responsible for electrical and lighting installations in vital factories. He rejoined BTH in England after the war and in 1946 returned to India to build for the first Indian fluorescent street-lighting and fluorescent cotton-mill lighting and lighted many prominent industrial, commercial and national buildings.

Philips Electrical Ltd. announce three major appointments to take effect from January 1st, 1959. MR. HECTOR THORNE, formerly General Regional Manager, South-East Region, is now a Personal Assistant to the Managing Director, responsible for Market Development; MR. W. F. CASIDY, formerly Regional Manager, Midlands Region, is now General Regional Manager, South-East Region; MR. D. E. BEARD, formerly Branch Manager, Bristol, has become Regional Manager, Midlands Region. Mr. Beard joined the Accounts Department of Philips in October, 1936. After war service with the Royal Signals in Europe and West Africa, he rejoined the company in 1946 and was appointed a Lighting Division Sales Engineer at Bristol. He was made Branch Manager in 1949. An active member of the Illumi-

nating Engineering Society, he was chairman 1954/1955 and has been a Council member since 1955. He also served as Chairman of the APLE, South Western Section 1956/1958.

MR. V. L. CLARE, at present a Lighting Engineer with the South-West Region of Philips Electrical Ltd., Bristol, has been appointed Area Lighting Manager for the Bristol Branch Area.

The General Electric Co. Ltd. announces the appointment of Mr. L. A. MILLS as Commercial Manager of its Osram Lamp Division. Mr. Mills, who joined the GEC in 1928, has been closely concerned with the marketing arrangements for Osram lamps and tubes in the United Kingdom for many years and was formerly Deputy Manager of the Osram Lamp Department. His new appointment is part of the reconstitution of the Company's General Products Group into Divisions.

MR. R. P. SAYERS, Assoc.I.E.E., F.I.E.S., M.S.M.A., has been appointed managing director of Griersons Ltd., electrical engineers and contractors, of London and Liverpool. Before joining Grierson Mr. Sayers was a Director and Sales Manager of Ashley Accessories Ltd. and a Director of Astral Switchgear Ltd.

Trade Literature

A.E.I. LAMP AND LIGHTING CO. LTD., Melton Road, Leicester.—Mazda Lamp Catalogues AL 190, AL 191 and AL 192 each cover a clearly defined range of lamps. Catalogue AL 193 brings these three sections into one bound volume complete with additional indexed information relating to all sections.

BETA MANUFACTURING CO., Poplar Works, Valley Road, Shipley, Yorks.—A new leaflet giving full details and prices of the "Wafer" fittings.

CRYSELCO LTD., Kempston Works, Bedford.—Several leaflets giving full information of industrial fluorescent fittings including the De luxe Channel fitting. Also available, leaflet on commercial and home lighting fittings.

CROMPTON PARKINSON LTD., Crompton House, Aldwych, London, W.C.2.—An illustrated booklet showing the installation of the "Modulume" luminous ceiling in factories, shops and offices.

EKCO-ENSIGN ELECTRIC LTD., 45 Essex Street, London, W.C.2.—Brochure giving full details and prices of "Essex" and "Economy" ranges of fluorescent fittings. Price lists for both ranges are available.

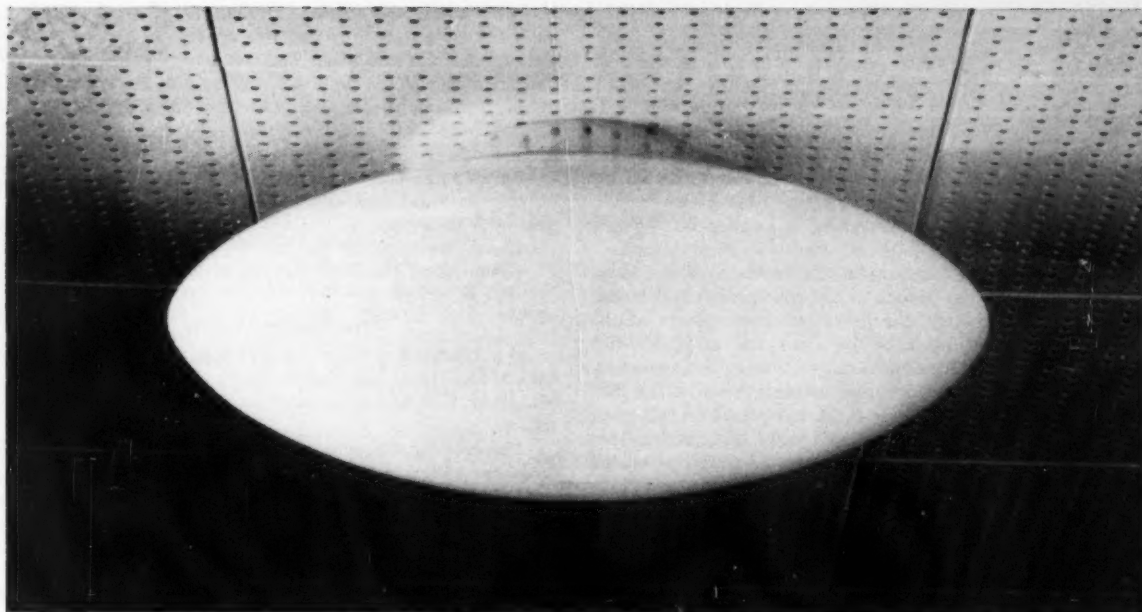
HARRIS AND SHELDON (ELECTRICAL) LTD., 46 Great Marlborough Street, London, W.1.—A new comprehensive catalogue of lighting fittings and equipment, including the new "Luveline" twin-lamp fitting. The catalogue is divided into five sections and contains full details of sizes and prices.

LINOLITE LTD., The Mill Works, Malmesbury, Wilts.—A leaflet illustrating the "SPL" picture reflector giving prices and sizes.

SIEMENS EDISON SWAN LTD., 38-39 Upper Thames Street, London, E.C.4.—Several leaflets giving information of the "Chester" wall mounting lanterns and other street lighting lanterns.

TROUGHTON AND YOUNG (LIGHTING) LTD., 143 Knightsbridge, London, S.W.1.—Leaflet giving details and prices of some additions to the "Mondolite" range of domestic lighting fittings.

VERITY'S LTD., Plume Works, Aston, Birmingham.—New catalogue giving information of the "Stayclean" fitting now equipped with Alux reflectors.



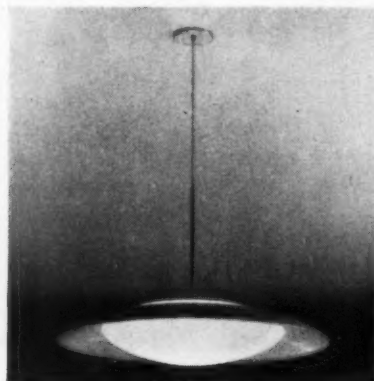
MA 1500 series from 34/8 plus tax

Designed by Paul Boissevain, Dip. Arch., M.S.I.A.

announcing the new **ELLIPSE SERIES** 10" 12" 14" 18" & 22" 60-300w

The Ellipse series provides architects and engineers with a basic range of 120 elegant lighting fittings, of slim appearance, which do a first class lighting job. The quality and finish is of the highest order, and the construction without use of screws or levers is simple, effective and foolproof, allowing for easy fixing and maintenance.

Prices are comparable with standard commercial units. Full details, including dimensioned drawings, are given in publication MA 1500 available on request.



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I.E.S. ACTIVITIES

London

A paper entitled "Some practical considerations in the design and manufacture of neon signs" was given by Mr. A. Urquhart at the sessional meeting in London on November 11.

After a brief introduction on the function of the neon sign and its scope and service in the commercial and industrial life of the country, the historical development of the use of the cold-cathode tube for signs and displays, with particular reference to technical developments, was reviewed. Reference was made to the early commercial use of the rare gases, early ballast systems and the stray-field transformer, the introduction of the fluorescent tube, the development of phosphors, and a recent approach to the problem created by the effect of cold weather upon the luminous behaviour of cold-cathode tubes in exposed sites. The influence of the growth in recent years of the use of "Perspex" as a diffusing medium was mentioned.

The designing of an illuminated sign culminates in the complete specification of an installation which may range in size, shape, colour, function and appearance from a small shop-window sign consuming a few watts to a project 200 yards long, weighing 20 tons and taking a load of 30 KVA. A luminous sign has to fulfil the intended commercial function, have the required aesthetic appeal by day and night, be in conformity with the principles of good engineering set out in IEE regulations and British Standards, and lie within the law as administered under the Town and Country Planning Regulation, 1947.

The paper dealt with these aspects of manufacture by discussing and illustrating the approach by which the combined salesman-surveyor-artist designer team appraises the factors involved. The paper commented upon their examination of the commercial purpose of the sign, its relation to and integration with existing architectural work, collaboration with architects on new buildings, the concealment of associated gear and cabling, the correct choice of character, colour and intensity of tubing, halation and legibility, the effect of neighbouring installations, the accessibility at the site for erection and after-sales service, the law and permissions. The informed and competent handling of these factors, said Mr. Urquhart, will have as its end-product the artist-designer's conception of the ideal installation, unique to the individual requirements of the site.

In fabrication and erection, the governing principles are those designed to yield an installation which represents the best in mechanical and electrical engineering practice, while losing nothing of the artist's concept. By using, as illustration, the fabrication and erection of one of the largest animated installations in the country, Mr. Urquhart discussed the main practical considerations involved in fabrication and erection.

Leicester Centre

At a meeting of the Leicester Centre on Monday, November 24th, Mr. P. Petherbridge, of the Building Research Station, spoke on the basic studies of lighting and vision and the development from these studies of principles and aids to good lighting practice. Mr. Petherbridge illustrated his talk by a film showing the various aspects of research work, including the use of models in daylight studies. These models included schools, hospitals, offices and public build-

ings and he created considerable interest by explaining how natural daylight had to be related to permanent supplementary artificial lighting and visual fatigue. This form of research provided most valuable information when determining the depth and general design of modern buildings. Mr. Petherbridge mentioned that the Building Research Station cost the country approximately £600,000 per year to operate; this he considered was a very reasonable figure bearing in mind that the building industries annual turnover was something in the region of £2,000,000,000. The discussion was opened by Mr. H. Bellchambers and Mr. L. Adrian Jones proposed the vote of thanks.

Nottingham Centre

At a luncheon attended by over fifty members and friends held at the Black Boy Hotel, Nottingham, on October 9th, Mr. B. M. Cobbe was inducted as chairman for the 1958/59 session.

The retiring Chairman, Mr. I. A. A. Macdonald made reference to the block and gavel and to the badge of office and collarette all of which had been presented to the Centre by past chairmen. He then inducted Mr. Cobbe as chairman and wished him a happy and successful year as the first chairman to wear the Centre's own badge of office.

In a brief address Mr. Cobbe referred to the shift system of working which was practised more extensively in the USA than in this country. He said that successful shift working demanded not only satisfactory working conditions but a way of life which was attractive and acceptable for those who worked at night. Lighting had a big part to play. At work it should be adequate for safety, ample for efficiency, and should, with colour, provide a gaiety and excitement to hold the interest and to banish gloom or depression during the hours of darkness.

It would not be sufficient to provide these conditions only at places of work. The theme of gaiety in lighting should be extended to the shops and the streets particularly in the central areas of our large cities and, of course, to the homes.

The Lord Mayor of Nottingham, Alderman J. Littlefair, J.P., who attended with the Lady Mayoress, replied to the toast of the City of Nottingham which had been proposed by Mr. Cobbe. After referring to the development of lighting over the past two hundred years he said that he felt that the lighting industry was as yet only on



Mr. L. E. Gibbs (Chairman) with Mrs. Gibbs and the President and Mrs. Smith at the recent Annual Dinner of the Birmingham Centre.

the threshold of its great career. The Lord Mayor then proposed the toast of the Illuminating Engineering Society. In reply, the President, Mr. C. C. Smith, said that he thought that those connected with the building trade did not pay enough attention to lighting. New houses, he said, were still being built with a single pendant fitting in each room and asked "How can adequate home lighting be obtained from such an installation?"

Manchester Centre

At the meeting of the Manchester Centre on November 6th, Mr. H. L. Gloag, of the Building Research Station, spoke on links between colour and lighting in buildings. Mr. Gloag supported his remarks with a large number of slides which were remarkable for their quality and beauty and were most effective illustrations of the effect of colour in enhancing both interiors and exteriors.

That colour ranks with texture and perspective in the architectural conception was Mr. Gloag's introduction; he followed this with a brief résumé of colour specification and the use of the Munsell System and the application of B.S.S. Standard Colours. The effect of each colour component was discussed and illustrated, together with the suffusing effect of colour, the use and effect of shadowing, and the changes due to change of light source, together with the importance of white to enlighten the effect of adjacent colours of similar lightness, or its use dramatically between surfaces not otherwise in harmony. Mr. Gloag felt that the whole range of colour must be appreciated as a whole, and deprecated the use of colour names as tending to restrict this conception. The influence of contemporary artistic thought upon architecture was next discussed, and many illustrations were shown of the results of the colour consultant's work in a wide range of installations. A lively discussion was opened by Mr. T. L. Robinson, and a vote of thanks to Mr. Gloag was proposed by Mr. E. Smith.

The Annual Dinner of the Manchester Centre was held at the Café Royal, Manchester, on November 12th. The toast to The City and Ports of Manchester was proposed by Mr. J. D. Ducker, the Chairman of the Centre, and a most witty and able response was given by Alderman Sir Richard Stephenson Harper, Kt., J.P. The toast of the Society was given by Mr. R. B. W. Whitehouse, Chairman of the Association of Supervising Electrical Engineers, who spoke of the very close contact between the two Societies and said that in support of the Jubilee celebrations of the IES, lighting was to be the theme of the next Electrical Engineers Exhibition at Earls Court. Mr. J. S. Liversage proposed a toast to the guests to which Mr. Leonard C. Howitt, City Architect, replied.

FORTHCOMING EVENTS

LONDON

January 13th

"Designed Appearance Lighting of Gloucester Cathedral," by J. M. Waldram. (At the Federation of British Industries, 21, Tothill Street, S.W.1.)

CENTRES AND GROUPS

January 2nd

BIRMINGHAM.—Biennial Exhibition of Lighting Fittings. (At Bennett Hall, Y.M.C.A.)

January 8th

MANCHESTER.—"Random Review of 1958," by A. G. Penny. (At North Western Electricity Board, Town Hall Extension, Manchester 2.) 6 p.m.

NOTTINGHAM.—"The Artistic Use of Lighting in Multi-camera Television Technique," by H. E. H. Mayhew. (At the Electricity Service Centre, Nottingham.) 6 p.m.

January 9th

BIRMINGHAM.—Annual Dinner. (At Queen's Hotel.)

EDINBURGH.—Annual Supper and Buffet Dance. (At the Grosvenor Hotel.)

January 12th

LEEDS.—Forum on Home Lighting. Joint Meeting with E.A.W. (At the British Lighting Council, 24, Aire Street, Leeds 1.) 6.15 p.m.

SHEFFIELD.—"Mine Lighting Problems," by A. Roberts, W. J. Wellwood Ferguson, A. G. Neill and B. N. Clarkson. (At the Department of Mining, University of Sheffield, Mappin Street, Sheffield.) 6.30 p.m.

January 13th

EDINBURGH.—Joint Meeting with Edinburgh Electricity Society. (At the Lyceum Gallery, Atholl Crescent, Edinburgh.)

January 15th

GLASGOW.—"An Analytical Approach to Industrial Lighting," by W. Imrie-Smith. (At the British Lighting Council, 29, St. Vincent Place, Glasgow, C.1.) 6.30 p.m.

January 19th

BATH AND BRISTOL.—"Open Space Lighting," by M. W. Pierce and H. F. Stephenson. (At Gardiner, Sons and Co. Ltd. showrooms, Broad Plain, Bristol.) 7 p.m.

January 20th

LIVERPOOL.—"New Light Sources," by F. Jackson. (At the Merseyside and N. Wales Electricity Board Industrial Development Centre.) 6 p.m.

January 21st

NORTH LANCASHIRE.—"An Architect's Approach to Lighting," by G. Grenfell Baines. (At the Demonstration Theatre, North Western Electricity Board, 19, Friargate, Preston.) 7 p.m.

January 26th

LEEDS.—"An Outline of Television Studio Lighting Problems," by R. Koplück. (At the Yorkshire Electricity Board, Ferensway, Hull.) 6.30 p.m.

LEICESTER.—"Industrial Lighting," by R. H. Sanders. (At the Demonstration Theatre, East Midlands Electricity Board, Charles Street, Leicester.) 7 p.m.

STOKE-ON-TRENT.—Annual Dinner.

January 28th

CARDIFF.—"The Eye and Artificial Lighting," by W. J. Wellwood Ferguson. (At University College, Cardiff.)

January 30th

BIRMINGHAM.—"Display Lighting for Shop Windows and Fashion Parades," by H. H. Ballin. (At Bennett Hall, Y.M.C.A.)

NEWCASTLE-UPON-TYNE.—Jubilee Dinner and Dance. (At the County Hotel, Neville Street.)

POSTSCRIPT By 'Lumeritas'

WHEN the new Factories Bill which is now before Parliament reaches the Statute Book it will impose upon the Minister of Labour a duty to promote health, safety and welfare in factories by inaugurating and assisting investigations to this end. Although this will be a new statutory provision, many investigations have already been assisted by the Factory Department and encouraged by their co-operation. This is true of a number of the investigations into the effects of lighting in factories which were made during the inter-war years, before "sufficient and suitable" lighting in all factories was made obligatory by the Act of 1937. During the second reading of the new Bill the Minister was asked why he had not included some of the recommendations of the Gowers Committee concerning the environmental conditions of shop and office workers. These workers are not now "protected" by statutory regulations concerning lighting as are people who work in factories. However, the lighting of many offices has been much improved during the past ten years, and it may be that lighting conditions generally in such premises will become satisfactory before the advent of any statutory regulations. That is as it should be. Anyway, it is not the Government's intention to bring shops and offices within the ambit of the new Factories Bill, although this does not mean that legislation to implement some of the recommendations of the Gowers Committee will not be introduced later on.

CURIOSITY has prompted me to look through two well-known glossy monthly magazines devoted to the cult of the perfect home to see how advertisers are selling lighting to home lovers. In the most lush of these magazines—having a total of 180 pages—I found one-eighth of one page occupied by an advertisement of crystal chandelier kits. That was all. In the second magazine, three-eighths of one of its 120 pages was occupied by two lighting ads., one of which was that of the crystal chandelier firm. The magazines were winter month issues; had it been otherwise I would have been less surprised to find that lamps and luminaires were merely "also rans". Irrelevantly, I may add that a pair of French two-light silver candelabra, made two hundred years ago, have just realised £800 at Sotheby's.

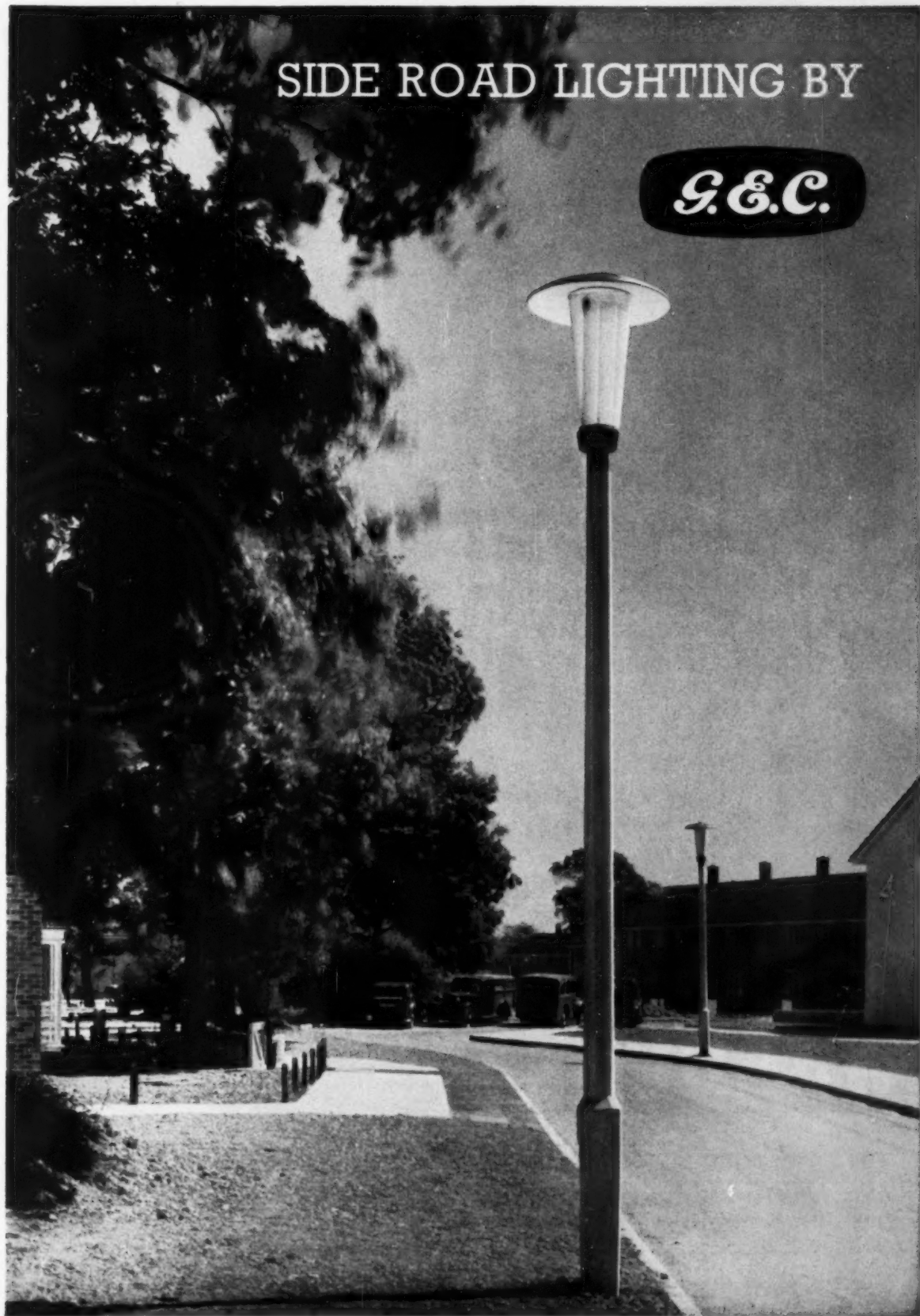
IT appears that I disappointed one of my readers in November by writing in "unimaginative terms" about the most recently proposed American standards of illumination. Actually—apart from specifically pleading not guilty to being "anti-high-illumination"—what I wrote boils down to a few questions of the kind I "imagined" most "customers" might pose, to wit:—(1) How far can the raising of recommended levels be expected to go? (2) How do we know that the visual comfort with 1,000 lm/ft² of general lighting was greater than with 100 lm/ft² and sufficiently greater to warrant the higher value? (3) How is thermal discomfort avoided with what

I will call "third power" lighting installations? (4) What is the point of providing 600 lm/ft² of general lighting in an office where one-fourth of this value will give one of the most difficult visual tasks likely to be encountered sufficient brightness to allow "5 APS, maximum practical accuracy and a supra-threshold visibility factor of 15"? "Well, I only asked"! From my disappointed reader's letter to the Editor I gather that I may find the answers to such questions as these by perusing the new American IES Lighting Handbook; when this becomes available I shall hasten to do this. Meanwhile, if the reader in question will re-read my November comments he will find that I did not suggest that an illumination of 1,000 lm/ft² need be glaring. I am very well aware that values of this order are common outdoors, and I am able to write my comments in the even brighter light of summer days (when we get any) without needing to wear dark glasses. So what? I can also write them very comfortably with 20 lm/ft². I wonder whether my disappointed reader is as knowledgeable on the subject of adaptation as he is on daylight illumination levels?

Anyhow, in the new American "Recommended Levels of Illumination"—except where it is clear from the naming of the application, e.g., operating table, that the high illumination is localised—most values of 200 lm/ft² and upwards are starred with reference to a note explaining that the value is "obtained with a combination of general lighting plus specialised supplementary lighting". A similar qualification applies to high values where they are recommended in our own Code. If, however, this qualification is ignored in proposed lighting schemes is there not a risk of provoking a "reactionary" attitude among users on account of the high cost and uncertain benefits of very high level general lighting? And, surely, the point is not that very high levels of general illumination can be obtained without glare by the luminous ceiling method but whether it is worth while to get them in this, or any other, way in workrooms. However, let it not be thought that I am "agin" luminous ceilings; quite the contrary. In appropriate situations they are excellent. But good maintenance of lighting installations of any kind is very important, and I should like to know comparative maintenance costs for different types of luminous ceiling and other types of installation. In a recent issue of the *Architect and Building News*, my fellow columnist "Abner" raises this point and others in similar vein to those I raised last November. I quote: "Now that the all-over bright ceilings in solid or perforated plastics is with us, it is surely time to ask when and where it is all going to stop. We are now being told by manufacturers that we must have our shops and offices as brightly lit as display windows or television studios." Again, "Soon we shall heat our buildings by artificial light, with cooling systems for the summer, and it will not be long before make-up for men becomes a necessity." Is there here no premonition of a possible reactionary trend?

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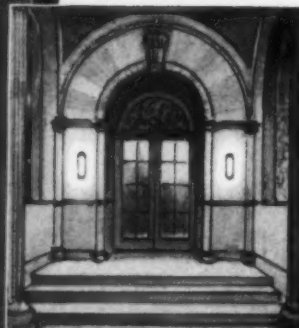
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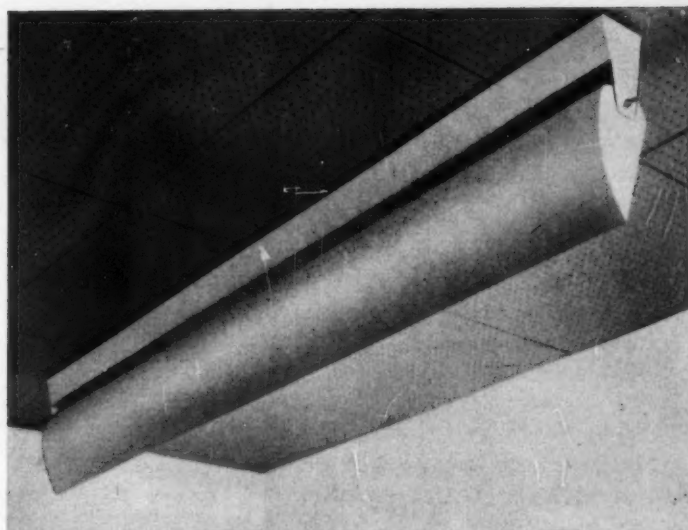
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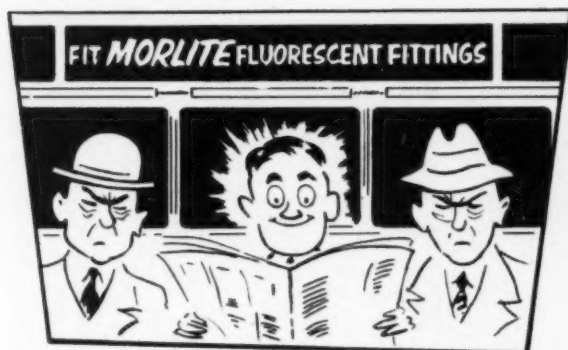
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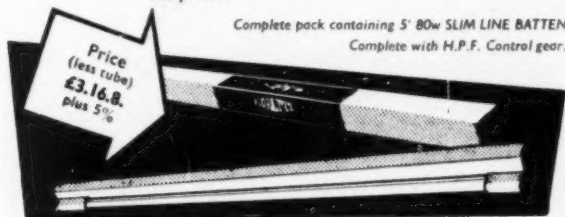
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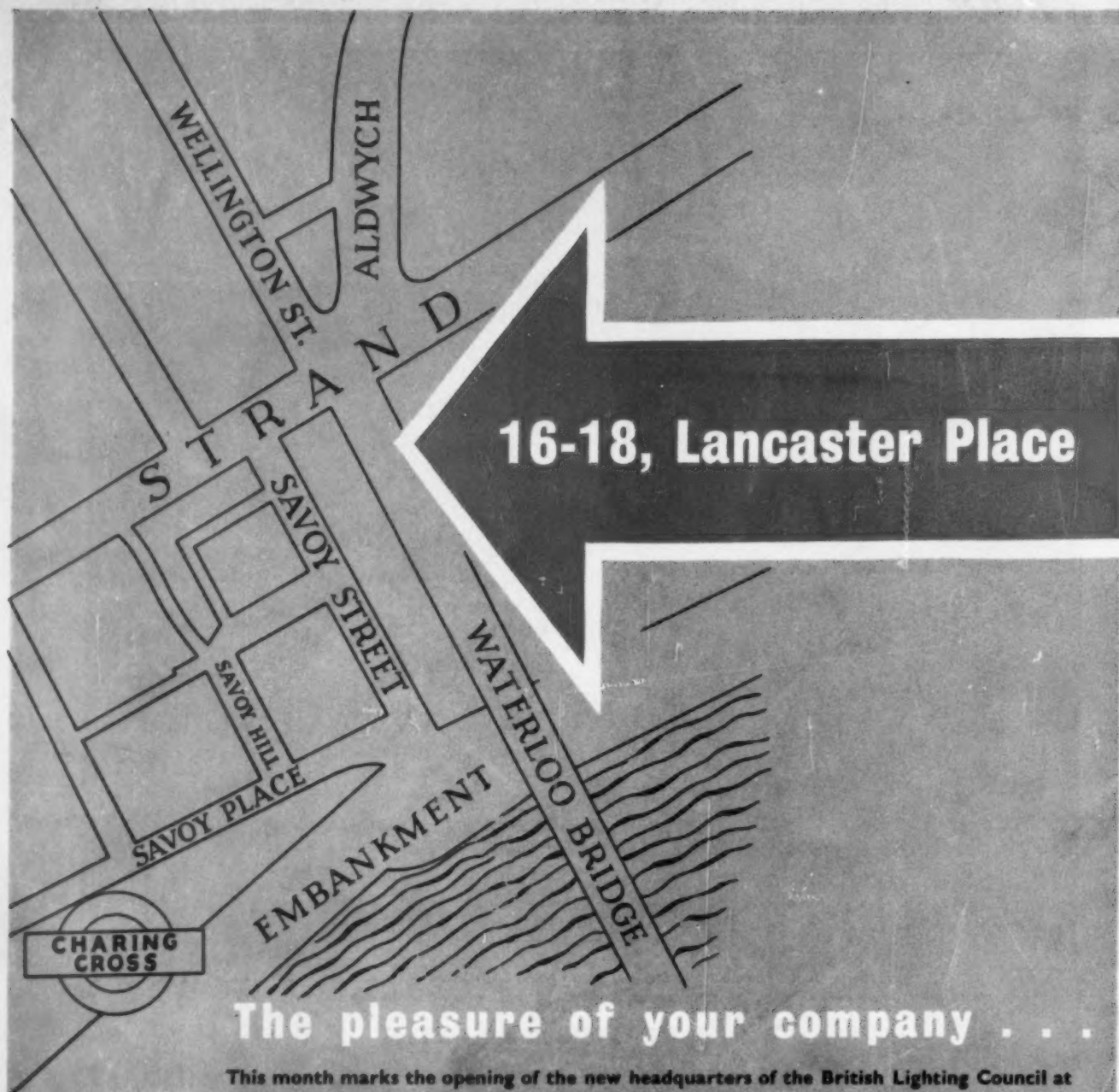
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